

COAL AGE

The Only National Paper Devoted to Coal Mining and Coal Marketing

C. E. LESHER, Editor

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Number 1

Sane Thinking on Transportation

CONSIDER for a moment the significance of the fact that the railroads have many friends. But a few years ago the most maligned industry, today befriended by all save La Follette and his radical following. What has brought about the change and why do we find the United States Chamber of Commerce coming to the rescue of the railroads at this critical juncture? Because the business men of this country have finally learned that it is fatal to make an important industry the plaything of politics. There was a time when the public was exploited by railroad financiers. That day is past and the carriers are paying for their past follies with surrender of their freedom to regulation.

But even regulated, they have rights and the shippers of the country have rights, of which there should be no surrender to politics. Hence the National Chamber is making the people think of transportation sanely. It has had a careful study made of the whole subject and will have a huge conference on transportation in Washington next week—not to solve the questions but to make people see the problems in other than the refulgent light of Congress' halls.

Why Not Telephone?

PERHAPS there is a reason why we do not have active "Coal Exchanges" in this country, such as are described by Paul Wooton in his article elsewhere in this issue. There are coal exchanges in a number of our cities, as Cincinnati, but they are not active buying and selling organizations, but rather more often social. The nearest approach to a coal exchange as found in England is that conducted under the amiable direction of Herman M. Griggs at Cleveland—the Lake Erie Ore & Coal Exchange, where during the season of navigation coal, ore and ship chartering are freely traded at the noon hour in the halls, offices and dining room. Buyers and sellers get together and all that is lacking to make the picture a duplicate of the daily gathering Mr. Wooton describes at Newcastle-on-Tyne is a statistical record of the business done or a blackboard on which to post sales.

Now, coal is bought and sold in this country in greater volume than in Great Britain. At Chicago, Cincinnati, Pittsburgh and perhaps other centers doubtless more tonnage of coal is traded in than on the largest British exchange, but here without the open marketplace. How is it done and why has the exchange never come into vogue? Certainly not because of legal inhibitions, for we have exchanges in other basic commodities, as sugar, cotton and wheat. Some reason doubtless exists in the natural disinclination of the coal trade to do anything different or new. But the main reasons for sticking to the present system of trading in coal are the efficiency of our telephone and the large bulk of contract business done.

The modern private telephone exchange is for a coal

company as the coal exchange is to the Englishman whose telephones are nowhere nearly as quick as ours. The best equipped companies have young men for the leg work of calling on the trade, but the office telephone is the mainstay of business.

It might be added that the only buyers that might be expected to attend a trading exchange in this country would be other coal traders; consumers are so accustomed to being besieged by salesmen in person, over the phone and by mail that they would have slight interest in the initiation of such a market place.

It is obvious that the coal trade would be much better off were it to have some reliable, up-to-the-minute record of sales and prices other than that afforded by gossip. The problem of the business papers reporting the market would be simplified thereby, it is true, but that can hardly be advanced as an argument for a revolution in the free and easy business practice of our coal traders.

"The First Robin" Is The Same Robin

WITH such a caption the Central Pennsylvania Coal Producers Association in a recent bulletin discusses the outlook as respects labor and wages. The statement which is carried in full elsewhere in this issue, notes that whereas in former times, discussion of wage agreements began with joint conferences of miners and operators, now it starts by conferences at the White House, where John Lewis and Secretary of Labor Davis call on the President, and by "dire predictions of strikes" emanating from the non-union operators. It is further noted that the union coal operators have not been consulted as to their necessities.

Then follows the advice to the United Mine Workers that they should understand that unless they help to establish conditions in the union fields permitting their employers to meet the competition of non-union operation, they will suffer lack of work even as the mines in which they work will suffer lack of market. It is prophesied that the union fields will become the "uneconomical" units of the soft-coal industry, doomed to go. The present competition from non-union areas adjacent to Central Pennsylvania is stressed and reductions in wage below the present 25 to 35 per cent cuts are prophesied as soon as the "union coal operators have been safely signed, sealed and delivered by another agreement." Criticism of this opinion is invited.

Now there is no gainsaying the fact that if and when the union fields renew their present scale, then will it be in order for the non-union fields to put general wage cuts into effect. So far they have held their ranks remarkably well, but the leaders of the South are finding it increasingly difficult to maintain that position. The protestations of union operators that they have concrete evidence of extensive competition from non-union coal at lowered cost indicates that the good resolutions of non-union operators are already dissolving.

The basic plea made by Central Pennsylvania oper-

ators is that their union miners give heed to the economics of the situation, face the fact of non-union wage reductions in effect and in prospect, and consent to meet those cuts by a reduction in labor costs of producing coal in that field. This has been put forward in the face of resolutions from the union locals demanding the 30-hour week and a 20-per cent increase in wages.

The statement of the case, therefore as far as Central Pennsylvania is concerned, is not new; it is 1922 over again. It will be remembered that John Lewis then answered that he did not propose to enter a competition with the non-union fields in wage cutting, that in such a contest the union areas would always be a lap behind and hopelessly outclassed. He therefore in 1922 elected to stand pat and the record of his success is clear. There is nothing to indicate that he has changed his policy or that he would be less successful in 1924.

The loudest talking is being done by those operators who, even though they may not want to have a strike, require that there be one, realizing that it will save them financially and by those in the United Mine Workers who are opposed to the Lewis *régime*. Central Pennsylvania is sore pressed, will be even more heavily pressed with a continuation of present conditions and knows not where to turn for relief, save to appeal to the men to be reasonable, face the facts and consent to join with the operators, their partners in business in meeting the situation.

It is then not difficult to agree with the general tenor of Central Pennsylvania's statement of the case, but it must be asked in return, what it proposes to do in the event that the union will not amicably consent to wages being so reduced as to meet non-union competition. Lewis is strong enough, it is believed, to get from his union a renewal of present wage scales but who has any idea that, no matter how he personally feels, he is, or will be, able to get the union to agree to a reduction? Hence how can there be thought of reduction without thought of a trial of strength?

We have no criticism of Central Pennsylvania's statement of opinion, but we do ponder what the answer may be.

Protecting the Buyer

ALBERTA has put into effect a real coal act. Even before Pinchot began dabbling in coal regulation the Legislature of Alberta passed (April 21, 1923) a Coal Sales Act that in September was made effective in all its provisions. Among other things ordered in this law are the branding of all coal by registered name, the requirement that operators and dealers display the name of the coal, its origin by mine, the district, size, grade and quality, when shipped and destination. Inspection is authorized at any time or place by properly designated officials.

From this it may be gathered that the purpose of the act is not to regulate prices, direct distribution, punish profiteers, prohibit resales, require publication of cost, prices, wages, profits and what not—in other words not a so-called fact finding measure. Rather the purpose is to protect the buyer by making it possible for him to know whence came his coal. That seems to be something heretofore overlooked by the legislation drafters in this country, and we commend it to their attention. A few more provisions to the proposals already formed may not break the camel's back.

There is another provision in the Alberta act that is sensible—that it is effective only until May 1, 1924. The lawmakers may have conceded that they were experimenting and agreed to make the sentence short for the coal man.

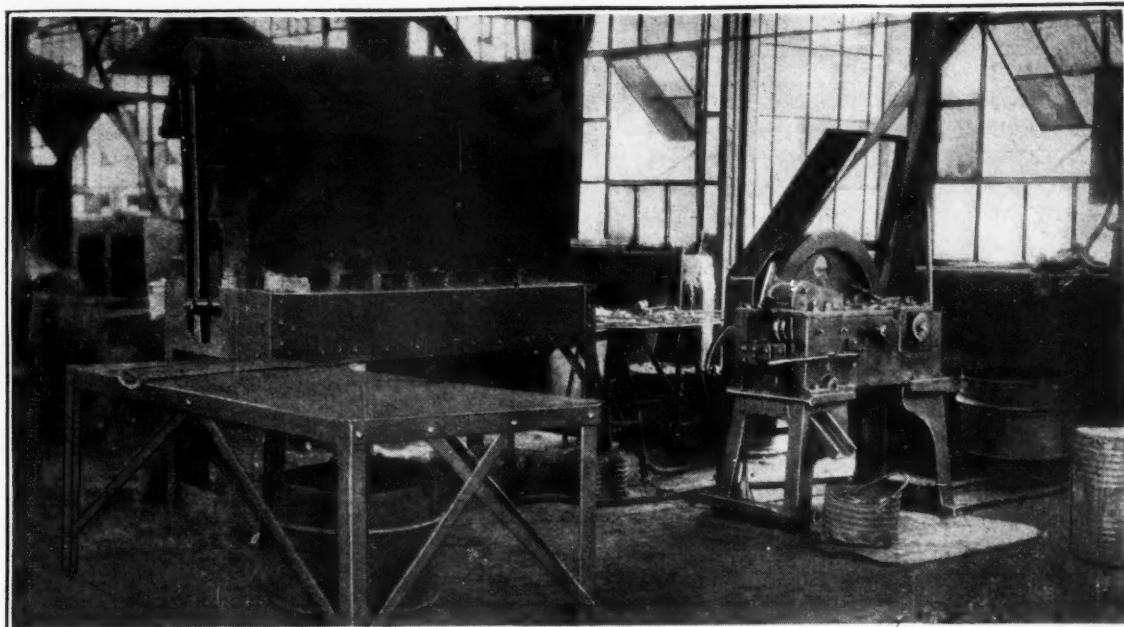
Are You Watching for Crop Fires?

AT ALL times the mines are subject to the menace of coal crop fires. In the summer forest and clearing fires are apt to ignite the coal through crop holes, the embers from the fire often falling through crevices and large openings in the roof and coming in contact with the coal. In other cases fires in slate piles and coal storages are likely to be communicated to an underlying or neighboring seam. Even the most harmless of slate piles are in the bituminous regions likely to burn, for all the slates in the coal measures are, in a degree, oil shales. That they are free of actual coal is no assurance that they will not ignite and burn into what is now known as "red dog." Ashes from boiler houses and from blacksmith shops also are a possible menace. The fact that they are not located near the particular seam being worked affords no security if they are near another seam, for a fire well started is not necessarily confinable to a single bed and a fire in a lower seam may make mining in an upper one impossible.

Managers of mining properties will do well to keep a watch on adjacent lands because fires started on these properties may extend to their own and the parties owning these lands may be little concerned as to the possible firing of the coal and in most cases may be too poor to make an adequate attempt to extinguish a fire when once started. Fires have been initiated, as Henry Phythyon has shown, by the burning of garbage. Possibly the persons starting them had an expectation that exposed coal either in the solid or thrown out of the hole would aid in sustaining the heat of material naturally disinclined to burn. They little thought that the small fire they started might devastate many acres.

The Bitner fire, that of the Youghiogeny & Ohio Coal Co. with that in the residential portions of Pittsburgh may serve to remind the public of the difficulty experienced in extinguishing such fires. Many shallow fires, especially in the anthracite regions, have cost millions of dollars. It is only necessary to refer to that on Summit Hill and to one which before it is extinguished may be equally costly—the Red Ash fire near Wilkes-Barre. One is likely to look upon shallow mine fires with less interest than those in the heart of a mine but they are apt to be far more expensive before they are quenched, if such extinguishment is ever ultimately achieved, as is to be greatly doubted.

The report of James Archibald, mining engineer and agent of the Girard Estate, mentions three fires in mine breaches caused by the ignition of rubbish, two at Kehley's Run Colliery and one at Packer No. 4 Colliery. Fortunately they were extinguished promptly. An ash-bank fire also occurred in the same year, 1922, at the William Penn mine. Discovered in August of that year it is said to be under control. The mention of these fires in the annual report of the Girard Estate is evidence of the importance that this estate lays on this possible form of destruction. Extinguishment of all crop fires is an essential part of any company's conservation program and one not to be dismissed with indifference, even if outside its immediate holdings.



*Equipment for Forging and Tempering Cutter Bits**

Correct Forging and Tempering Methods Double The Life of Undercutting-Machine Bits

Each Crew Carries Its Own Bits, Receiving and Delivering Them Through a Checking Station—How Cost Records Are Kept—Three Men in Turn Forge, Grind and Temper Each Bit

BY ALPHONSE F. BROSKY
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DISSATISFACTION caused by soft and brittle cutting-machine bits disgusts machine men and prevents them from cutting the scheduled yardage, thus upsetting the loading and haulage schedules of the mine. At the Lynch operation of the United States Coal & Coke Co. 1,800 cutter bits are given a correct shape, a sharp point and a correct temper every working day and only three men are employed in this service. Since the tempering has been made painstakingly and systematically the work done by each bit has been doubled. But before coming to that let me explain how the crews get their bits promptly and in accord with their needs, for at many mines that we know bits often go astray or arrive in inadequate numbers, and in consequence places are not cut. When men cut at night a little uncertainty or discouragement sends them home early to their beds.

Adjoining the tool room at the entrance to the machine shop at the Lynch mines is a station in which a record is kept of the cutter bits to be sharpened and issued each day. This system has been introduced for the purpose of preventing the machine runners from disturbing the bit sharpeners. After cutting their places the machine crews bring out their dull bits in regulation army canvas knapsacks and on their way to the bathhouse stop at the bit station to check them

in. The attendant, who also has duties in the tool room, places a check on the bag and gives a corresponding one to the miner.

This system has several advantages over the customary manner of handling bits. Foremost among these is the assurance given to each crew that it will have sharp bits, as one member of each crew carries to his cutting machine a sufficient number of bits to last one shift. Furthermore, bits are thus handled by but one man from the check room to the mine face, and he is the man most interested in their safe arrival. Moreover, with this arrangement the services of a bit boy are not needed. In some mines locomotive crews and mule drivers have to pass the bits from hand to hand. In the Lynch mines they are relieved of that responsibility, and hence are not delayed in the performance of their regular duties. Haulage is too vital a responsibility to be held up by giving motormen and drivers the duty of delivering bits to working places.

The man who sharpens the bits notes the check number on each knapsack and counts the number of bits it contains, entering the figures in a book provided for that purpose. He also records later the number of sharp bits placed in each bag. The form sheet used for this purpose is illustrated in Fig. 1. Sharpened bits are returned to the bit station ready for distribution and in each bag are placed sharp bits equivalent to the number of dull bits it contained when the crew to which it belongs brought it to the bit station. Where

*A forging machine, a good furnace, two steel tables, two sand boxes, two oil baths, three men and a well scheduled process provide each day for the machine crews 1,800 cutter bits that are really sharp and honestly tempered.

DATE					DATE	NUMBER OF BITS	NUMBER OF SETS	PLACES CUT	TOTAL AVERAGE LABOR COST PER BIT
CHECK NUMBER	NUMBER DULL BITS TURNED IN	NUMBER SHARP BITS ISSUED	MINE AND SECTION	NAME					

FIG. 1

FIG. 2

DAILY RECORD OF DISTRIBUTION AND MONTHLY RECORD OF COST OF REPOINTING CUTTER BITS

Each day machine crews are provided with one sharp cutter bit for every dull one they turn in. Tally is kept of the transaction in the form shown in Fig. 1. Daily cost of sharpening cutter bits for each mine is kept from depleted in Fig. 2.

no records are kept the crews on cutting machines frequently are discontented, for at times they do not receive the number of bits they need for their work. If a crew turns in sixty dull bits it expects that number to be returned. When a machine runner or his helper calls in the evening for his bits the attendant in the station fills in the two right-hand columns of the record form—the name of the machine man and the section of the mine in which he works.

Cost figures on the sharpening of bits are kept by the man in charge of the bit station. By a knowledge of the time spent by the men engaged in sharpening he is enabled to ascertain a labor charge for each bit and to allocate the total cost of labor to each mine. This account he keeps in a record book in the form shown in Fig. 2. From each crew he gets information as to the number of places cut during each shift. It is a simple matter to figure the cost and to determine the average number of places cut for each set of bits.

The labor cost of sharpening is kept separate from that of making new bits. These latter are formed from bars of special tool steel, cut to length in a shearing

machine. The labor cost of making new bits is charged to supplies, and the account is handed to the supply clerk. As the machine runners must get new bits from the supply room, an accurate record of the cost of new bits (material plus labor) may be kept. A supply of 400 to 500 new bits is held for current replacements.

Three men are employed in the processes of shaping old and new bits. One man heats and forges them in a bit-sharpening machine, another grinds the upper surface of each and a third does the tempering. By dividing labor in this manner, better results are obtained, each man becoming more skilled in his work than he would be were he to perform all three processes. In either case the number of bits that must be sharpened each day at the Lynch mines requires the services of three men.

Heat for forging and tempering is derived from a single coal furnace, detailed in Fig. 3, and shown also in the headpiece of this article. Air draft can be furnished to the furnace either by an individual blower or else by a feed line from a central blower which supplies air to the blacksmith forges. The individual unit is preferable, of course. In the front of the furnace are eight ovens each of which is big enough to accommodate eight bits.

Four holes are used for heating the bits that have to be forged and the remaining four holes are utilized for tempering purposes. Wide-mouthed prongs serve to handle a set of eight bits at one time. In the process of forging, the bits are withdrawn from the fire one at a time and in regular rotation. The air blast is regulated to maintain in the furnace a temperature high enough to give the correct heat to each bit in the time required to complete the forging of 32 bits (eight bits in each of four ovens). This constitutes a cycle. A uniform temperature in the furnace imparts the same

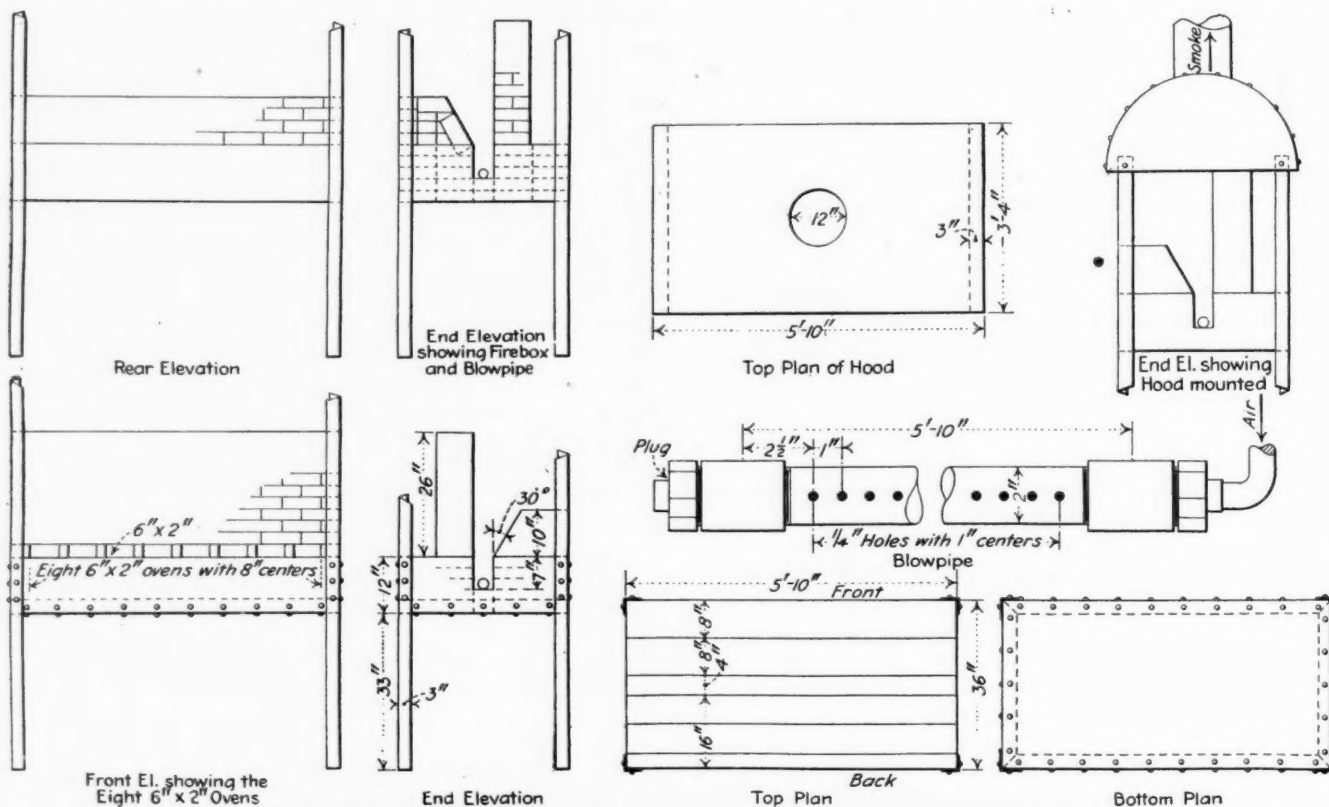


FIG. 3—HEATING FURNACE FOR FORGING AND TEMPERING CUTTER BITS

This coal furnace closely resembles a gas furnace in that its design is such as to cause the flames to shoot out of the fire openings where the cutter bits lie. The latter do not come in contact with the coal.

heat to bits that are tempered as is given to those which are forged. Satisfactory results are obtained by this arrangement.

Where the degree of hardness required for the cutting of a certain coal is such as can be obtained only by heating the steel to a temperature higher or lower than that required for forging, I would suggest that a firewall be built to divide the furnace into two compartments. Then each compartment can be fired separately, and the draft in each regulated by an individual valve in each of the arms of a Y-connection from the main line.

After the bits are forged, they are cooled, and then ground on their upper surfaces so as to remove the scale of oxide which forms on the steel in the forging operation, thus providing a fresh metallic surface on which the man who does the tempering can better observe the manifestations of color when the heat is being drawn out of the steel. The following is a description of the heat-treating process:

Eight bits are stacked side by side to form a set, and staggered so that the tips of four of them alternately project about $\frac{1}{4}$ in. in advance of the four remaining bits. Four sets are placed in the four ovens provided for the purpose. One set of eight bits is removed from the fire upon being heated to the correct temperature. The eight bits as a unit are quenched in an oil bath for a sufficient length of time to reduce the heat to the desired temperature.

GETTING THE CORRECT TEMPERING HEAT

This time is gaged by observing the color of the oxide forming on the bit. The set of bits, grasped in a pair of prongs, rests on a metal-covered table during the observation period. The correct degree of tempering is indicated by the appearance of a filament of blue oxide which forms progressively toward the tip of the bit in the zone of tempering. The staggering of each set makes it easy to remove one or more bits without disturbing the others if it is manifest that they have not received proper treatment.

Uniformity of hardness in the zone of tempering is obtained by burying the tips of the treated bits in sand. An equalization of temperature is obtained in this manner without annealing them to a point where they are soft. Too great a degree of hardness, caused by too rapid cooling, is manifested by the appearance of a straw-colored oxide in the tempering zone.

Bits rejected because they have been overtempered are allowed to cool and later treated again. Those that are undertempered are further treated in the oil bath before they are buried in sand. An average of about one bit for every set treated is rejected for further treatment. After being cooled, all are removed from the sand box and inspected. Any that appear to have been overtempered or undertempered are grasped individually in a pair of blacksmith tongs having a small mouth, and the tips are struck against steel. When undertempered the tip will show its degree of malleability by bending over; when overtempered the tip of the bit will show that it is too hard by breaking off.

Three men will repoint about 1,800 dull bits in one shift at an average cost of 1c. per bit. The cost of pointing a piece of bar steel to form a new bit is $1\frac{1}{2}$ c. Since the institution of the tempering process at the Lynch mines a set of cutter bits on a shortwall cutting machine will cut, for each sharpening, twice as many places as before.

How to Minimize Breakdowns Of Electrical Machinery

Importance of Cleanliness and Regular Lubrication—
Bearings Should Be Kept Cool and Renewed
Promptly—Replace Fuses Carefully

By C. H. S. TUPHOLME

London, England

THOUGH breakdown of electrical machinery often can be traced to some cause quite outside the operator's or engineer's control, there are many instances where a little more care or a little more skill on the part of an attendant would have averted a breakdown. It is therefore necessary that every engineer in charge of electrical equipment see that the men under his supervision are thoroughly well trained in how to handle and care for the equipment.

In the first place, cleanliness is most important. All electrical machines and apparatus should be kept scrupulously clean, dry, and free from oil or dust, particularly copper and carbon dust, which are the most frequent causes of breakdowns of electrical plant. Oil rapidly destroys many of the materials commonly used for insulating purposes, while films of copper or carbon dust form conductive surfaces capable of short-circuiting the parts between or upon which they lie.

The parts of generators and motors requiring most attention are the insulating washers and bushings of the brush rigging, the inside surfaces of hollow commutators, the spaces between the end connectors of armatures and between the commutators and the armature cores inside the end connectors, and the insulating rings at the bearing end of the commutators.

PROTECT INSULATION FROM DETERIORATION

A fairly stiff brush and a pair of bellows, or better still, a blast of compressed air, will be found useful for removing dry dust and dirt. If oil is mixed with the dirt, a little gasoline may be used, and the parts thus cleaned should afterward receive a coat or two of good insulating varnish. Generators and motors should be dismantled at least once a year and thoroughly overhauled and cleaned; the windings should be revarnished.

When filling the oil wells in the bearings, great care should be taken to prevent any overflow. Every oil well should have an overflow pipe and drain tap, and every enclosed machine should have a drain pipe at the lowest point of the casing. A good quality light engine oil should be used, and it should be renewed or filtered from time to time. When renewing the oil, clean out the bearings and oil wells before putting in fresh oil. Always see that the oiling rings revolve freely after the machine has been started.

CARE OF BALL AND ROLLER BEARINGS

If the machine is fitted with ball bearings a good quality neutral grease is the best lubricant. Under ordinary conditions, with the ball races filled with a suitable grease, the bearings will run for several months without further attention, unless they are exposed to excessive dirt or dust. Do not put too much oil into the oil wells nor force too much grease through the ball races. Oil or grease will get onto the insulated parts of the machines, and deterioration and damage eventually will result. The proper amount of oil or grease put on a bearing will last a considerable time, and it is

unnecessary to be continually adding fresh lubricant when ring oilers or ball bearings are used.

Bearings should be renewed as soon as they show appreciable wear. This is especially necessary in the case of alternating-current motors, where the clearance between the stationary and revolving parts is very small. Comparatively little wear of the bearings will cause these parts to come into contact and cause serious damage. In the case of a hot bearing, fill up the oil well. If possible, keep the machine running slowly until the bearing has cooled. The heating may be due to lack of oil, a tight belt, dirt in the oil, or a bent shaft. All contacts and screw connections on machines, backs and fronts of switchboards, switches, fuse blocks, and other electrical equipment should be periodically tightened and kept perfectly clean, as heating at loose or dirty contacts is a frequent cause of fire and variations in motor speed and supply voltage. This, however, should be done only when the power is cut off.

When the intersegment micas are undercut the grooves thus formed should be kept free of dirt and dust. Carborundum cloth or sand paper may be used for smoothing the surfaces of commutators and slip rings if these should become roughened by sparking. If the commutators or slip rings are out of true, or if bad flats have formed, they must be turned true.

The following are the principal causes of sparking:

Direct-Current Machines

- (a) Overloading.
- (b) The brushes may not be set at the best position for sparkless commutation. In the case of machines having interpoles, a very small difference of position may cause considerable sparking, and in addition has a marked effect on the voltage regulation of a generator and the speed of a motor.
- (c) The various sets of brushes may not be equidistant from one another.
- (d) The brushes may not be of the right quality.
- (e) The brushes may not be free in the holders.
- (f) The brushes may require fitting to the commutator.
- (g) The brushes may not have sufficient pressure on the commutator.
- (h) The commutator may be rough, dirty, oily or out of true.
- (i) Vibration of machine, owing to faulty foundations or drive.
- (j) There may be a break or open circuit on one of the armature coils. This causes bad sparking and the burning away of the mica insulation between those commutator bars to which the faulty coil is connected.
- (k) One or more of the armature coils may be short-circuited. This causes overheating and burning of the insulating material of that particular coil.
- (l) The intersegment micas may be too hard, and therefore projecting beyond the surface of the copper.

Alternating-Current Machines

- (a) The brushes may not be of the right quality.
- (b) The brushes may not be free in the holders.
- (c) The brushes may require fitting to the slip rings.
- (d) The brushes may not have sufficient pressure on the slip rings.
- (e) The slip rings may be rough, dirty, oily or out of true.
- (f) There may be excessive vibration.

The fuse is the safety valve of an electric circuit. If a fuse blows after having been properly adjusted, the supply should be shut off, the contact surfaces and binding screws or the fuse blocks should be cleaned, and a new fuse, of the same size as the old, put in. Should this blow there probably is a ground or short-circuit

on the system. On no account should a fuse that is too large to give proper protection be substituted.

In replacing a fuse care is necessary to neither stretch nor otherwise injure the wire when attaching it to the terminals, and also to see that good and clean contact is made between the wire and the terminals. If this is not done local heating will take place, in which case the fuse will melt at a lower temperature than it would otherwise.

Copper strips or wires make very reliable fuses, but for very small currents—say below 14 amp.—tin composition wires are more suitable owing to their being more convenient to handle. For large currents—say over 100 amp.—it probably is better to use some form of mechanical-overload circuit breaker.

As a general rule every circuit should be protected by a fuse or other circuit breaker, which will open the circuit with a current not exceeding double the normal full load. In many cases it is not advisable to allow so great a departure from normal working conditions, while in exceptional cases a greater margin may be permitted.

In the case of alternating-current motors of the squirrel-cage type, which may take from three to six times the full load current at starting, the connections should provide for the normal fuse being temporarily shunted or out of circuit during the period of starting. The type and form of the fuse holder has considerable influence on the efficiency and reliability of the fuse as a circuit breaker.

KEEP TOOLS AWAY FROM DYNAMOS

As many breakdowns have been caused by foreign bodies falling or being drawn against revolving armatures by the magnetism of the field, or otherwise, attendants should be cautioned not to use the tops of machines as tables, nor to have steel or iron tools, or oil cans near electrical machines. Copper oil cans are preferable to those of iron or tinfoil. The tops of switches, starters, controllers, and resistance frames or boxes also should be kept clean and not be used for placing loose articles.

In starting direct-current motors care should be taken to move the switch arm slowly across the contacts of the starting resistance, in order to prevent the armature receiving an excessive current while getting up its speed. The contact studs of the starting switch should be kept clean and smooth. Deterioration, from corrosion, of the resistance coils in connection with a starting switch when mounted in a damp location may be prevented by the application of one or two coats of a good moisture-resisting enamel. Immediately after starting up a generator or motor the attendant should see that all bearings are being properly lubricated and that the oiling rings are revolving properly.

Before switching current onto any motor, care should be taken to see that the handle of the starter is in the "off" position. In the case of a direct-current motor, if a shunt regulator is used all resistance should be cut off at starting, while in the case of a direct-current generator with a shunt regulator connected, all the resistance should be in circuit at starting.

After a generator or motor has been installed and connected up, a diagram, plainly showing the actual connections, should be made and hung up near the machine. Such a diagram will often save much time in the event of any trouble with the machine or starting equipment.

John C. McNeil Describes

More Short-Line Ways of Handling Coal Sales

Accounting Is Not Writing a History of Past Transactions
So Much as Recording the Immediate Status of Accounts
In Order to Afford a Basis for Decisions as to Credits

ALTHOUGH modern methods of mining have superseded the old way of the pick miner, and the "hay-burner" has given way to the electric mule in haulage, archaic methods still seem to prevail in the office.

The principal object of any accounting system is to serve the management as a guide by which to direct future operations, and if the system is a history, rather than an up-to-date statement of facts, it is useless for any such purpose. Pen-kept records cannot be kept up to date like machine methods, and the time required at the end of the month to prepare the statements for customers, make up the payrolls, pay off the bills and render the necessary statements to the management and the owners is so long that before the statements are out, another month is upon the office force.

The underlying principles of machine accounting are the same as those in other methods, with the addition of controls and proofs not obtainable under the old pen methods of accounting. Ledgers are kept in balance and up to date, so that it is possible to take off a trial balance of the accounts or to render a statement which is in exact balance with the ledgers at any time.

EVERY RE-ENTRY AN OPPORTUNITY FOR MISTAKE

Take, for example, the pen system of handling accounts receivable. After a car of coal is loaded at the mines a bill of lading must be made, and after the coal has been weighed the shipment must be entered in the shipping record. An invoice is then made up, either from the bill of lading or from the shipping record. If the invoice is made from the bill of lading it is used as the posting medium for the shipping book or if the invoice is made after the shipping book is written up, this book becomes the posting medium. After the invoice is mailed, entries are made in the accounts receivable ledger, using either the invoice or the shipping book as the posting medium.

At the end of the day, or period of operations, sometime at the end of the month, the shipping book has to be totaled and balanced, the accounts-receivable ledger accounts totaled and balanced, statements taken therefrom covering each account, added and balanced with the ledger. In order to keep the end-of-the-month peak load down to the limits of human endurance, the usual custom around coal-mine offices is for the bookkeeper or his assistant to keep posting statements from time to time during the month so as to have them ready at the end of the month for mailing to customers.

As it is of the utmost importance to get statements of accounts receivable out on time it is almost the invariable custom to mail these statements before the general ledgers are balanced. Should the accounts-receivable ledger be out of balance with its control at the end of the month nothing can be done other than

to adjust the control to agree with the statements mailed to customers.

By the short-line methods hereinafter described, the work of the coal-mine accounting office is shortened, the invoice being made, the ledger being posted, the customer's statement being prepared and the sales or shipping record being made at a single operation. At the same time by using machine accounting the balance due from each customer is calculated down to date, showing these balances on his ledger account and statement as well. So at the end of the month, there is nothing to do but mail the statement to the customer. This can be done just as soon as the invoices for the last day of the month are made out.

EVERY MONTH BEGINS WITH OVERTIME SHIFTS

Accounts payable at coal mines are either handled through the voucher system, or through the use of an accounts-payable ledger, and sometimes through a combination of the two. Under the former system accounts-payable invoices are accumulated at the end of the month, vouchers drawn for them and then entry is made in the voucher register distributing accounts.

Under the latter, invoices are entered in invoice registers and postings made to the accounts-payable ledgers. Statements are then taken off for remittance advices, entries made in the cash book of checks drawn and then the cash entries are posted to the accounts-payable ledger. Under either plan of operation the end of the month brings long working hours to the office force, working under strain, and the accounts-payable liability is not known until all of these entries have been made. In the short-line method described herein these accounts are posted, voucher or remittance advice made and distribution is made at the same time, with an additional knowledge at the end of each day of the exact amount of liability.

The archaic method is a costly one and aside from the delays and peak loads, expense is an item to be considered.

As previously explained, the chief advantage of machine accounting is having the ledgers always in balance and the general ledger entries up to date. The advantages of machine accounting are based upon the same principles that have enabled undercutting machines and haulage motors to effect savings in time and labor. This system was designed with the idea of saving time and labor as well as having accurate accounts, legibly written and the maximum of work done at one operation.

Accounts Receivable—The system of dealing with accounts receivable has already been described in detail in my article entitled "Machine Bookkeeping Speeds Accounts at the Mine," which appeared in *Coal Age*, Aug. 30, pp. 319-322. Reference therefore is made to that article. The forms given on page 321 as of the General Coal Co. do not cover errors arising from charging the wrong party, over- or under-charging, allowances for defective preparation, prepayments of

This article by John C. McNeil precedes one on handling of expense accounts, payrolls and the general ledger. It should be read in connection with the article in *Coal Age* of Aug. 30, 1923, pp. 319-322.

FORM A-9
CENTRAL COAL COMPANY

DAILY JOURNAL OF CREDITS TO ACCOUNTS RECEIVABLE

OLD BALANCE	DATE	NO	DESCRIPTION	CR ACCOUNTS RECEIVABLE	BALANCE	ACCOUNT CREDITED	REPEAT OLD BALANCE	DEBIT BANK	DR SALES ALLOWANCE	SUNDY DEBITS NAME	AMOUNT	DR NOTES RECEIVABLE
885 50	8/1/25		CHECK NO 47850 OF JUNE 814 8178	177 80	844 00	R C TRAY COAL COMPANY	885 50	177 80	80 00	MINING NUMBER 1	20 00	843 85
840 00	8/1/25	85	ALLOWANCE ON LAW 7080 80 TONS AT 100	80 00	840 00	R C TRAY COAL COMPANY	840 00					
800 25	8/1/25	86	PREPAYMENT ALLOWANCE ON THREE CARDS	50 00	840 00	SOUTHERN COAL COMPANY	840 00					
840 85	8/1/25		TRADE ACCEPTANCE ON 100 80 TONS	840 85	0 00	MARKET JELLED COAL CO	840 85					
775 50				1121 35	1864 75	TOTALS PROOF	2775 40	177 80	80 00	20 00	843 85	

Old Balance less Credits Agree with new Balance

Distribution Agree with Credit to Accounts Receivable

FORM A-8
CENTRAL COAL COMPANY

JOURNAL OF SUNDY ACCOUNTS RECEIVABLE DEBITS

OLD BALANCE	DATE	NO	DETAILS	DR ACCT'S REC	BALANCE	ACCOUNT CHARGED	REPEAT OLD BALANCE	PREPAID FREIGHT	MISCELLANEOUS CREDITS	CREDIT ACCT
885 50	8/1/25	130	PREPAY FOR L & M 80280 80 TONS AT 1 50	80 00	925 50	R C TRAY COAL CO	885 50	80 00		
1845 50	8/1/25	131	PREPAY ON TWO FRAMPT 80 TONS AT 1 00	40 00	1065 50	ELITE STEAMING COAL CO	1065 50	80 00		
1118 14	8/1/25	132	RECEIPTHOUSE IN RATE ON LAW 7080 80 TONS AT 25	7 50	1073 00	CHICKADEE COAL CO	1073 00	100 00	7 50	MISC BANKING
4021 97				107 50	1180 50	TOTALS PROOF	4061 07	100 00	7 50	

Old Balance plus Debits Equal new Balance

Old Balance equals Proof

Distribution Agree with Trial Balts

FORM B-2
CENTRAL COAL COMPANY
CENTRAL CITY, KY

THE CENTRAL NATIONAL BANK OF LOUISVILLE, KY.
WILL PAY TO THE ORDER OF:

CHECK NUMBER 108848
BELMAY NEW & MFG COMPANY
DISCOUNT 10 08
NET AMOUNT 522 34
DATE OF CHECK JUNE 15th 1925
DEDUCTED FROM PAYABLE BY BANK

AUGUSTED: CENTRAL COAL COMPANY
BY: TREASURER

ON EACH THIS STATEMENT AND RETAIN FOR YOUR RECORDS
CENTRAL COAL COMPANY - CENTRAL CITY, KY

DATE OF INVOICE	MEMO	CREDITS	DEBITS	BALANCE	NAME OF VENDOR
8/1/25	187 NO 4450	55 25			
8/1/25	187 NO 4452	178 90			
8/1/25	187 NO 4456	278 80			
8/1/25	187 NO 4457	228 80			
8/1/25	CR 8881 2241		88 25	886 75	BELMAY NEW & MFG CO
				885 00	BELMAY NEW & MFG CO

FORM B-4
CENTRAL COAL COMPANY

REGISTER OF CHECKS ISSUED ON ACCOUNTS PAYABLE FOR 1925

DEBIT ACCT'S PAYABLE	CHECK NO	PAYEE & ADDRESS	CREDIT DISCOUNTS	CREDIT BANK	DATE OF CHECK	PROOF OF POSTING	REMARKS
1285 00	128546	BELMAY NEW & MFG COMPANY	10 08	522 34	JUNE 15th 1925	588 00	
1029 80	128546	LOUISVILLE CHICKEN COMPANY	10 08	1018 72	JUNE 15th 1925	1028 80	
1518 78	128547	BATLES BROTHERS & COMPANY	50 58	1468 20	JUNE 15th 1925	1518 78	
1285 00	128548	R C TRAY & COMPANY		1285 00	JUNE 15th 1925	1285 00	
3021 58			31 28	2690 30		2690 30	TOTALS PROOF

Discounts Credits and Bank equals Debit Amount Payable

Old Balance equals Proof

FORM A-6
CENTRAL COAL COMPANY

ACCOUNTS RECEIVABLE CREDIT MEMO

CENTRAL CITY, KY 1925

R C TRAY COAL COMPANY
LOUISVILLE, KY

WE CREDIT YOU AS FOLLOWS:
MAKE NECESSARY CONTRA ENTRY

OLD BALANCE	DATE	NO	DETAIL OF ACCOUNT	AMOUNT
0 00	8/1/25			
180 25	8/1/25			

FORM A-7
CENTRAL COAL COMPANY

JOURNAL OF ACCOUNTS RECEIVABLE - INTER ACCOUNT TRANSFERS FOR 1925

OLD BALANCE	DATE	NO	DESCRIPTION	DEBITS	CREDITS	BALANCE	CONTRA ACCOUNTS	REPEAT OLD BALANCE
825 50	8/1/25		LAW 7080 80 TONS BE CHANGED TO DEBIT PREL CO	100 00	100 00	825 50	R C TRAY COAL COMPANY	825 50
125 80	8/1/25		LAW 7080 80 TONS GRANTED TO R C TRAY & CO IN ERROR	100 00	100 00	1447 10	DEBIT PREL COMPANY	1447 10
1447 10				100 00	100 00		TOTALS PROOF	1447 10

Old Balance plus Debits, less Credits equal new Balance

Old Balance and Proof agree

FORM B-1
CENTRAL COAL COMPANY

JOURNAL OF ACCOUNTS PAYABLE CREDITS

OLD BALANCE	DATE OF INVOICE	MEMORANDUM	CR TO ACCOUNTS	BALANCE	NAME OF VENDOR	REPEAT OLD BALANCE	ADMINISTRATIVE AND GENERAL EXP	COAL MINING DEBITS	DATE	GENERAL LEDGER DEBITS
0 00	8/1/25	187 NO 4450	55 25			0 00	55 25			
945 40	8/1/25	187 NO 4452	178 90	940 25	BELMAY NEW & MFG COMPANY	940 25		185 90		
799 52	8/1/25	187 NO 4456	278 80	741 90	LOUISVILLE CHICKEN COMPANY	799 52		228 80		
1485 00	8/1/25	187 NO 4457	228 80	815 08	CARTER DRUG GOODS COMPANY	1485 00	55 25	128 50		
		CR 8881 2241	88 25	2245 50	TOTALS PROOF	2245 50		128 50		128 50

Old Balance plus Credits equals new Balance

Distribution equals Total Credits

FORM B-3
CENTRAL COAL COMPANY

JOURNAL OF ACCOUNTS PAYABLE DEBITS

OLD BALANCE	DATE OF INVOICE	MEMORANDUM	DR TO ACCT'S PAYABLE	BALANCE	NAME OF ACCOUNT CHARGED	REPEAT OLD BALANCE	CR ADMIN & GENERAL EXP	COAL MINING CREDITS	DATE	MISCELLANEOUS CREDITS	GENERAL LEDGER CR
888 25	8/1/25	CR 8881 2241	88 25	185 50	BELMAY NEW & MFG COMPANY	888 25	88 25				
1381 82	8/1/25	CR 8881 1280	94 85	1761 70	AMERICAN SUPPLY COMPANY	1381 82		181 78			
1085 82	8/1/25	CR 8881 1115	85 85	1675 85	BATLES BROS & COMPANY	1085 82		181 78			
5547 05	8/1/25	CR 8881 1280	1587 50	5193 30	R C TRAY & COMPANY	5547 05		1287 50			
6482 80	8/1/25	CR 8881 1228		1777 11	JEFFRIES MFG COMPANY	6482 80	65 25	1287 50			
14470 15				1089 04	TOTALS PROOF	14470 15		1287 50		42 50	42 08

Old Balance less Debits equals new Balance

Distribution of Credits equal Debits to Accounts Payable

freight and so forth. For these reasons have been added Forms Nos. A-7, A-8 and A-9. For the forms Nos. A-1 to A-6 see the article in question.

Often coal is shipped to prepay stations, necessitating the prepayment of freight charges, which of course, are chargeable to the customer. A debit memorandum is made against the customer on Form A-5 with the proper explanation. This is at the same time posted on Forms A-2 and A-3, "Accounts Receivable Ledger," and the "Customer's Statement," and in addition is entered on the "Sundry Accounts Receivable Debit Sheet," Form A-8 as a proof of accuracy and for General Ledger charges. These debit memoranda should be entered at one run, as illustrated on the few postings shown on Form A-8. Credit distributions are entered on these sheets and after postings have been completed the items will balance as shown on the form illustrated.

CREDITS TO ACCOUNTS RECEIVABLE SHEET

Credits to Accounts Receivable are through cash payments made on accounts by customers, Notes or Trade Acceptances given and Credit Memoranda. For this reason one Credit Sheet, Form A-9, "Credits to Accounts Receivable," is used and on this sheet is posted the appropriate data, using as before, at the same time Forms A-2 and A-3, Accounts Receivable Ledger and the Customer's Statement. Allowances to customers should be made through the medium of Credit Memoranda, Form A-6, which should be used in connection with the account forms described, viz.: A-2, A-3 and A-9.

The cashier should prepare, for the operator, cash posting slips for all cash postings, note slips for notes and trades acceptances and other authorities should prepare the data for the allowances. Predetermined totals should be taken of these items, so as to prove the accuracy of the work after postings are made. Postings to the General Ledger from these sheets are made in the same manner as from the Sales Sheet.

Under this system it is next to impossible to post an entry to the wrong account. If an invoice is made against the Brown Coal Co. the operator must also have the Brown Coal Co.'s statement and Ledger Sheet. However, should such an event occur, we have provided for that by the use of Form A-7, "Journal of Accounts Receivable Inter-Account Transfers." The Customer's Statement and Accounts Receivable Ledger should be posted in connection with this form and the total debits will equal the total credits on this form, which after completion should be posted into the General Ledger.

It will be seen from this description that it is not possible to make an entry in what is usually known as the books of original entry without also entering the amount in the ledger and on the customer's statement at the same time. In other words, the ledger and statement become as much the book of original entry as the journal.

Balances of each ledger account are taken after the completion of each entry and by the keeping of a control account in the subsidiary ledger to which totals are posted after the completion of each Journal or Proof Sheet, the operator can ascertain at once the total balance due on each account and as well on all accounts. In addition to this, an adding machine run of these accounts will prove with the total balance as shown by the subsidiary control sheet. This subsidiary control sheet will likewise be in accord with the control account kept in the General Ledger.

A complete account with different kinds of entries is shown, both as to statement and ledger account—see Forms A-2 and A-3, as an illustration of how they are worked. Under this short line system, the customer's statement is ready for the mail at any time. At the end of the month, when statements are ready to be mailed out, new statement sheets are headed and the last balances shown are entered as an item brought forward to the new statement. A proof sheet is kept in the machine which will be used as a trial balance or statement of balances due by customers. The total of this statement will agree, of course, with the balances shown in the "dummy" and general ledger controls.

Accounts Payable.—The usual method of handling accounts payable is either through a voucher system, making the vouchers direct from the invoices at the end of the month, or through an accounts payable ledger, posting credits and charging checks or other items. Either system requires a vast volume of work and incurs the ill will of the office force through the peak load at the end of the month.

ACCOUNTS PAYABLE VOUCHER SYSTEM

It being customary with coal companies of any standing to settle their accounts monthly on a cash basis, taking whatever discounts are necessary, they are not interested in an accounts payable ledger, showing debits and credits to creditors, together with the attendant labor of debiting these accounts with cash payments, discounts, etc. The principal object to be attained under this method is to see that all payable invoices are accounted for, that the creditor receives credit for his invoices and that a remittance slip is given showing the invoices paid. Other than that an account is not necessary, nor is it wanted. We have provided, therefore, under our short-line method for an Accounts Payable Voucher system instead of a ledger.

Invoices when received from creditors should be entered in a memorandum book of some nature by the accounting department, showing the date, name of creditor, amount and to whom referred. It might be well to number these entries beginning at the first of each month or at the first of each year, as desired by the accounting official. After the invoices are approved by the department receiving the goods, they are sent back to the accounting department, checked off this list and arranged in alphabetical order. A predetermined total is taken of these invoices, as was described for the accounts receivable entries. After this total is taken and entered in the chief accounting officer's memorandum book, they are handed to the operator for posting.

Form B-1, Journal of Accounts Payable Credits, is placed in the machine and Form B-2, Accounts Payable Voucher (in duplicate) is used. On the voucher is entered the invoice number (ours), date, amount of credit and new balance. This is automatically entered on Form B-1 at one operation and the distribution to the various accounts effected at the same time. It will be observed from the sample form herewith that the total charges to the distribution accounts will equal the total credit to accounts payable.

The total of the old balance column, plus the new credits, will equal the balances shown in the new balance column. After the invoices are entered on this sheet they should be cancelled as entered or credited to accounts payable, together with the date, and the journal page number and then filed away alphabetically. The voucher and its duplicate should be kept in the current

file for audit purposes. Credit memoranda issued by creditors should be posted on Form B-3, Journal of Debits to Accounts Payable and the proofs of posting on this are the same as on B-1.

When the accounts are due for payment, the voucher should be taken out and the invoices lifted from the alphabetical suspense file for audit purposes. The audit can be made by checking each of the items shown on the remittance advice. Form B-4 should now be used, filling in the check. The amount of the last balance shown in the balance portion of the remittance advice should be repeated on the check portion on the line "Amount of last new balance," the number of the check written in, the name of payee, the amount of discount to be taken on the total remittance and the machine will automatically calculate the balance, which is the net amount of the check.

The date of issue should next be written in. This will automatically make the check register, showing the total debits to Accounts Payable, total credits to discounts on purchases and total credit to the bank. After this is done the voucher and duplicate should be separated and the invoices covered by the voucher should be firmly stapled to the duplicate voucher and filed in the paid file alphabetically. This file will then give the invoices covered by any particular payment to a creditor, the date and number of check issued thereon, the amount of discount taken and the net balance due. The payee will of course, keep the remittance slip for his files and after the checks are returned by the bank and reconciled, they should be filed in numerical order.

Subsidiary and General Ledger controls should be kept on these accounts and the total of the vouchers remaining in the open file will agree at all times with the control figures.

Pressing Water Out of Peat

WATER is not readily pressed out of peat, for it is not in that substance as "water" but as gel, just like the water in a jelly. Recently J. W. Hinchley, professor of chemical engineering at the Imperial College of Science and Technology, London, England, has discovered that extreme cold and heat destroy the colloidal matter which holds the water in the peat, so that the moisture can be reduced to 40 per cent or even to 30 per cent by the application of pressure. Unfortunately, extremes of heat and cold are said to destroy the binding qualities of dried peat blocks to such a degree that they fall apart.

A REPORT on the Twentymile Park district of the Yampa coal field of Colorado, just published by the U. S. Geological Survey, which was prepared by Marius R. Campbell, shows the outcrops of all of the more valuable coal beds or groups of beds and the location of mines and prospects, by which the outcrops are generally marked. Particular attention was given to coal beds of the middle and lower groups, for these are the only ones that are now being mined on a commercial scale. The object of the work was first to determine the number, thickness, continuity, and geographical distribution of the beds and the quality of the coal in each bed. When this was done it was fairly easy to correlate beds in distant parts of the district, to predict where workable coal would be found in each bed, and to make an estimate of the available tonnage of coal in each section of land in the district.

The Miner's Torch

Our Mining Villages

PROBABLY the most misunderstood institution in connection with the coal-mining industry, so far as the general public is concerned, is the company-owned town. In all of my experience I have never run across an outsider who could visualize, even by the wildest stretch of the imagination, a company-owned town as a necessity. Even the social workers from the cities who journey out to the mining camps, prompted by the best of motives, have a hard time "being shown" as it were, when the subject comes up for discussion.

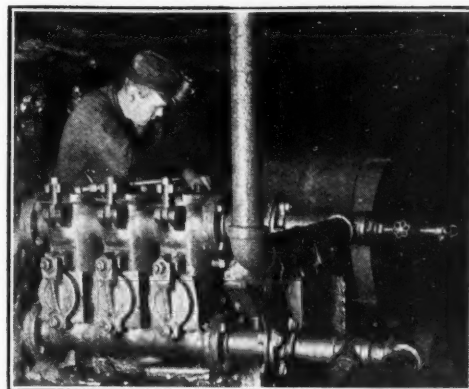
Once during a strike when a company that I was with was getting a lot of cruel publicity from the daily papers because of tenant evictions, I got a reporter to come out to my office so that I could give him the story of our camp, which started with a virgin tract miles from the nearest railroad and with not a home of any kind within a day's journey. One of the company's biggest problems was to get money enough to build the town that was required and to stock the commissary with goods for which payment could not be collected until the newcomers had a chance to make a start.

The reporter had never thought of the matter in quite that light, but it made little impression on him and he could not sense an interesting story in anything that I told him, so my trouble was all for nothing. Before he got out of our camp he saw some families moving out, and the story that he wrote next day showed that he had taken in every detail of that event.

I was not with him when he saw the departing families, so I was not allowed to explain to him that unless we could get possession of our houses we could not begin mining again, and that if all the idle mines should remain idle there would be a shortage of coal, and of necessity much suffering would follow. But some of my fellow superintendents did make such explanations to newspaper men, and they might as well have saved their words, judging by results accomplished. The reasonable rent that the miners had been charged was a thing of the past; the coal famine that might come was a thing of the future; but today families were being forced from their homes with no place to go and that in spite of the promises and efforts of the union—there was *the* story.

The above relates to incidents that happened years ago, and I have long since become hardened to the taunts of foes and friends outside of the mining industry, but it has lately occurred to me that it might have been better for the industry today had I and all the other superintendents of a decade ago remained sensitive to outside criticism, even to the point of going around with chips on our shoulders. One need only follow the reports from Washington to realize that the law makers and the general public are gunning for the coal man—the misunderstood coal man, without a friend at court—and he is likely to be hit at any time and in almost any spot. Unfortunately, all of this feeling against the industry is coming to a head at a time when it is threatened with overproduction and vanishing profits. We may even have to witness the abandonment of many company-owned towns.

Features That Should Be Embodied in the Design of Plunger and Centrifugal Pumps



Pumps, Crescent Coal Co., Bostler, Ky.

Mining Congress Committee Suggests Standards Which Should Govern Construction of Pumps in Coal Mines, Not for Gathering Water but for Its Delivery to the Surface

WHEREVER possible, all permanent pumping stations should be so constructed and the pumps so placed in them as to allow at least 3 ft. of space all around each pump, thus providing that ample room shall be available to get at all parts of the mechanism when it is necessary to make repairs. The height of the station should be such as to permit of the use of the chain blocks whenever heavy parts have to be removed. Space also should be provided adjacent to the pumproom for the making of ordinary repairs. In the larger pumping stations a hand traveling crane should be installed, and one end of the pump station should be extended about 15 ft. beyond the floor space needed for the reception of the pump or pumps.

This additional length should be served by the same traveling crane, and where ordinary repairs can be made, extra parts should be conveniently stored. In the larger pumping stations a work bench with vise should be supplied, also cupboards or lockers furnished with substantial locks and keys where all wrenches, small supplies, etc., can be kept safely for the exclusive use of the regular pump attendants.

UNDER 200 GALLONS PER MINUTE USE PLUNGER PUMP

No hard and fast rule can be made specifying when plunger and when centrifugal pumps should be used. In general, however, it can be stated that when the capacity is less than 200 gallons per minute, a plunger pump should be used and when the capacity is 2,000 gal. per minute or over, preference should be given to centrifugal pumps. Between these two limits the deciding factors are the heads against which the pump must operate and the cost of power required to operate the pump. In Table I a tentative suggestion is given as to the type of pump to be installed where the power charge is 2c. per kilowatt hour.

Specifications for Plunger Pumps.—Pump purchasers should give the following information to prospective pump builders: The number of pumping units required, the capacity of each pumping unit in U. S. gallons per minute, the total head against which the pump is to operate (this total head to include suction lift and pipe friction), the suction lift from the floor of the pumproom to the level of the water in the sump, the

length and size of both the suction and discharge pipe; also the speed at which the pump should be run. This should not exceed 65 r.p.m.

The purchaser also should inform the pump builders of the name of the firm that will furnish the motor for driving the pump, as well as the current characteristics; namely, whether direct current or alternating current can be furnished and at what voltage, also the phase and cycle if alternating current is to be used. If the purchaser furnishes the motor it should be one running at the speed recommended by the pump builder, and he should deliver the motor, freight prepaid, to the pump builder for mounting on the base casting.

SECTIONALIZE WATER END FOR LOW REPAIR COST

Plunger pumps should be of vertical, triplex, single-acting, outside-packed plunger pattern. As far as possible the water end should be of sectionalized design, so as to minimize the cost of repairs, and it is recommended that the pump should be of the pot-chamber pattern, should consist of three interchangeable water cylinders, three discharge and three suction pot chambers, all three water cylinders to be interchangeable as well as all pot chambers. The water cylinder should be of cast iron and the stuffing-box throats lined with bronze bushings.

The water valves should be of rubber, resting on bronze seats, and, as before stated, each valve should be set in its individual cast-iron chamber and be provided with covers for ready access to the valves. The valve seats preferably should be of the flange type, bolted between the bottom of the pot chambers and their connecting branches. Where the water is acidulous it is recommended that the water cylinder, pot chambers and connecting pipe be all wood-lined. All water cylinders and air vents should be tapped and furnished with drain valves.

Plungers should be of cast iron, accurately polished. For acid mine water, however, they should be of hard bronze or preferably of porcelain. The plunger glands should be constructed of cast iron, and each be provided with four gland bolts.

The crankshaft and connecting rods should be of cast or forged steel and the crank and crosshead pins should be fitted with adjustable brass boxes. Crossheads should be provided with adjustable babbitt-lined shoes.

Single-reduction gearing should be used between the

Abstract of report, Subcommittee No. 2 on "Permanent Pumping Stations" of Committee on Mine Drainage of Standardization Division of American Mining Congress; Herbert Axford, Ingersoll-Rand Co., Scranton, Pa., chairman.

TABLE I—PUMP EQUIPMENT FAVORED FOR VARIOUS HEADS

Capacity Gal. per Min.	100-Ft.	200-Ft.	Total Head			
			300-Ft.	400-Ft.	500-Ft.	600-Ft.
200	P or 1C	P or 2C	P	P	P	P
300	P or 1C	P or 2C	P or 2C	P	P	P
400	1C	P or 2C	P or 2C	P or 3C	P	P
500	1C	2C	P or 2C	P or 3C	P	P
600	1C	2C	2C	3C	P or 4C	P or 5C
800	1C	2C	2C	3C	4C	5C
1,000	1C	2C	2C	3C	4C	5C
1,200	1C	2C	2C	3C	4C	5C
1,500	1C	2C	2C	3C	4C	5C
2,000	1C	2C	2C	3C	4C	5C

Note—"P" signifies plunger pump; "1C," single-stage, double-suction volute centrifugal pumps; "2C," two-stage centrifugal pumps, or preferably two-single-stage volute centrifugal pumps in series; "3C," "4C," and "5C," three, four and five-stage centrifugal pumps, respectively.

motor and the crankshaft or pump. The pinion should be of forged, and the wheel of cast steel. All gearing should be furnished by the pump builder, who also should bore and keyseat the pinion to suit the motor shaft. All gearing should be protected by a sheet-iron guard so constructed as to be readily removed. The frame should consist of three vertical standards so arranged as to form outboard bearings for both pinion and crank shafts.

In pumps of larger size it is recommended that the gear pinion be mounted on an independent shaft supported by two ring-oiled babbitt-lined bearings attached to the two outer frames or standards, the motor being coupled to this jack shaft by a flexible coupling of the pin-and-buffer type. This flexible coupling should be furnished by the pump builder. He also should furnish a suitable cast-iron base plate for supporting the motor frames and pumps. The upper part of the standards or frame should form the main journal boxes which should be babbitt-lined and provided with all the adjustments necessary to afford a correct alignment in all three bearings in case any one bearing should be subject to excessive wear.

The pump builder should furnish a flanged iron water-relief valve set for a pressure exceeding that of the discharge by 50 lb. This valve should be bolted to the discharge pipe. Other equipment which he should provide are a 6½-in. dial vacuum and a 6½-in. dial pressure gage, grease cups for main journals, crank and crosshead pins, a revolution counter and a complete set of standard and special wrenches.

All castings should be clean and free from sand, dirt or blowholes. All parts proving defective in design, workmanship or material within a period of one year after the pump is received, should be replaced by the builder free of charge. All parts of the machine should be subject to the inspection and approval of purchaser's engineers, to whom full facilities should be given to test the pump at the factory under actual working conditions before the shipment is made.

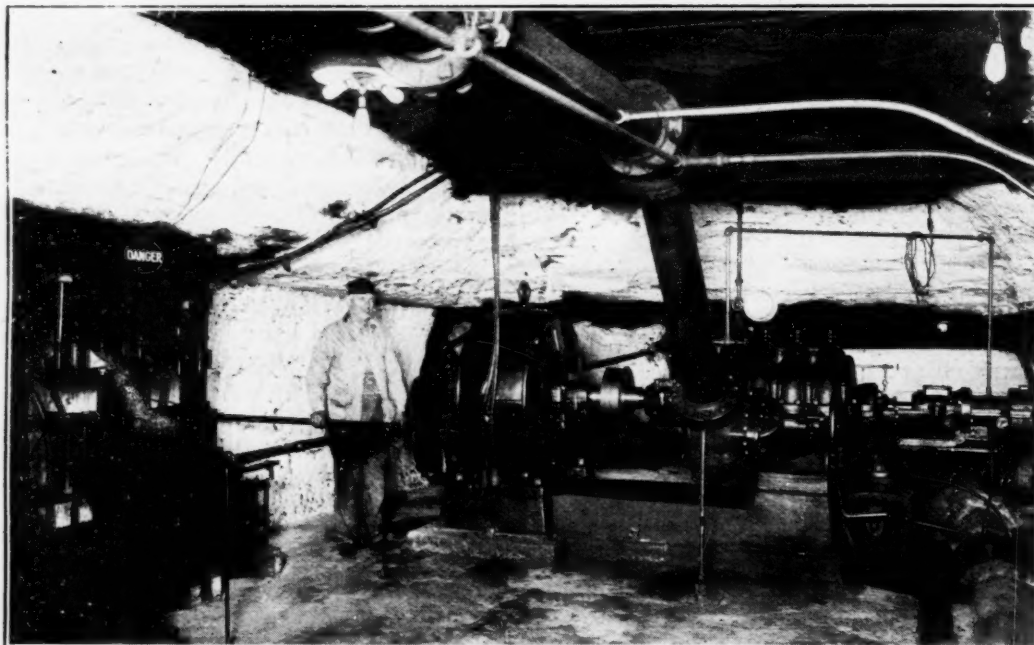
Pump builders with their proposal should furnish purchasers with the net weight of pump complete but without motor and should submit with their proposal blueprint giving sufficient data to form an intelligent conception of the pump. The pump builder also should state the time required to furnish pump after the receipt of full information regarding motor and any other manufacturing details.

Specifications for Centrifugal Pumps.—The purchaser should give the pump builder the same information as has been advocated already in the specification of plunger pumps. The pump should be of the horizontal type with horizontal split casing, suction and discharge connections being on the bottom half of the casing and so designed that by removing the upper half of the pump casing the whole interior of the pump will be revealed and can be examined readily. The pump should be so designed that if for any cause its rotation is reversed in direction, the machine will not be damaged.

The pump builder should furnish a heavy cast-iron baseplate for supporting the pump and motor and should accurately align both and place dowel pins in the pump base so that it cannot get out of alignment.

When pumping fresh water the casing should be of cast iron; when handling gritty water it preferably should be of special hard iron; when raising acidulous mine water the casing should be of acid-resisting bronze. As it is readily understood that the pump builders cannot know the conditions under which each installation must operate as thoroughly as the purchaser himself, it is recommended that the purchaser specify the material from which he desires the casing to be constructed.

In order to minimize repairs, the casing should be fitted with renewable sealing rings, the same material

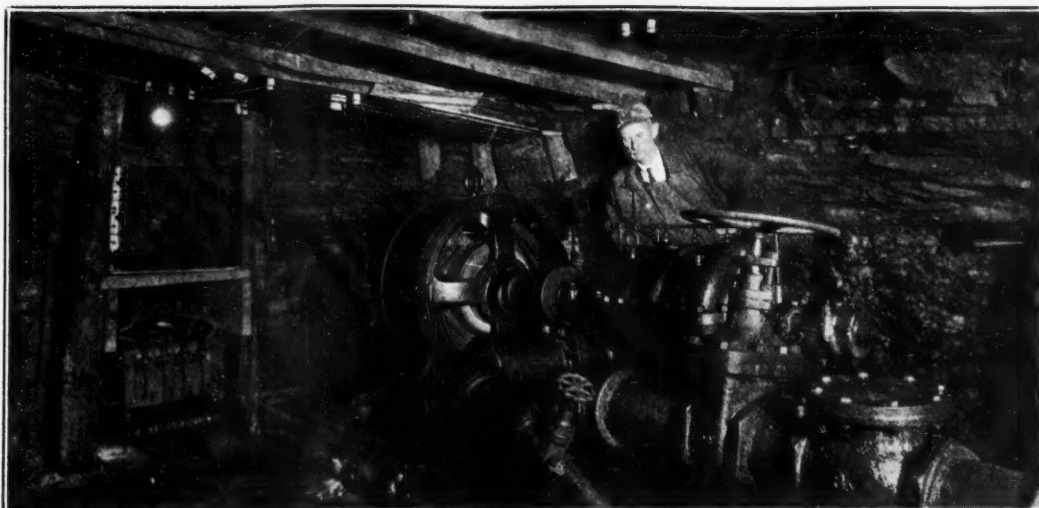


Three-Stage Pump

Workings at Orchard Slope, No. 1 Shaft. The subcommittee on permanent pumps advises that three-stage centrifugal pumps be used for 400-ft lifts when capacities of 600 to 2,000 gallons per minute are required and either a plunger pump or a three-stage centrifugal pump for raising 400 to 500 gallons per minute. Some engineers prefer to use single-stage pumps connected in series so that the various units can be disconnected or connected to others and the pumps adapted to the various lifts with which they may have to contend when moved from place to place.

Four-Stage Centrifugal

At the mine workings of the Consolidated Coal Co., Saginaw, Mich. Large capacity, minimum horizontal and vertical space occupied and low cost are among the good qualities of the centrifugal pump, especially when installed to take care of the overloads due to sudden floods.



being used as in the casing. These should fit around all revolving parts, suitable provision being made to prevent the rings from turning. For this purpose the use of small screws or dowel pins should not be permitted. All high spots of the casing should be tapped and furnished with suitable cocks for air vents; also cocks should be furnished to drain the entire casing.

The impellers should be of the enclosed type, made of bronze and fitted with renewable bronze rings secured by a shrinkage fit onto the impellers, no small pins or dowels being permitted.

Stuffing boxes should be deep enough to take not less than four rings of packing after allowing the glands to project $\frac{1}{2}$ in. into the stuffing box. They should be provided with renewable bronze neck rings or bushings. Each stuffing box should be fitted with a "Lantern" gland, furnished with suitable bronze cocks, pipe and fittings for an outside water seal. Glands should be of bronze, made in halves and fit snugly in stuffing boxes, but be bored out $\frac{1}{8}$ in. larger than their shaft to prevent them from riding on it or rubbing it.

The pump shaft should be of open-hearth steel, of liberal proportions and protected at those parts which come in contact with the water by cast-bronze bushings made to project through the stuffing boxes and forming collars to keep the impeller in place laterally, the whole so arranged that in case of wear they may be readily renewed without destroying the main shaft. Provision should be made to prevent leakage along the axis of the pump shaft. This can be done by inserting fiber gaskets between all bushings and hubs of the impeller. The impeller should be secured direct to the steel shaft by a bronze key. The shaft with its impeller, rings and coupling should be perfectly balanced before being placed in the pump.

The pump builder should furnish all couplings, which should be of cast iron and as light as possible consistent with ample strength. They should be of the flexible pin-and-buffer or other approved type. The motor coupling should be bored and keyseated and should be fitted to the motor shaft by the pump builder.

All couplings should be guaranteed to run cool 24 hours under full load without water cooling. All bearings should be lined with the best grade of babbitt or with some other approved anti-friction metal; be split and accurately fitted to cast-iron boxes with bolted caps, the whole so arranged that bearings can be removed,

rebabbitted or renewed without disturbing the shaft or other parts of the pump. Each bearing box should form a liberal oil well and be provided with gage glasses that will show that oil is present when the base is full of oil. It also should be fitted with plugs for draining the oil. Suitable washers or collars should be fitted on the end of the shaft to prevent water or dust working into the bearings.

Except where the pump handles very gritty water or the water is extremely acidulous, it is recommended that all multi-gage pumps be of the hydraulic balance type or of the back-to-back construction. However, in some designs of pumps it is necessary to furnish a thrust bearing that will take care of the end thrust when the machine is being started as well as any unbalanced thrust which may occur in operation. If furnished, the thrust bearing should be of liberal proportions with all suitable adjustments and so arranged as to allow of removal or repairs without disturbing or destroying the main pump shaft. The thrust bearing should be enclosed, self-oiling and capable of running cool under a full-load run of 24 hours' duration, and, if desired, this bearing can be water-cooled.

SAFETY GUARD SHOULD BE PROVIDED

To protect the motor from injury due to pump leakage caused by the blowing out of a gasket or other packing, also to prevent the operative from being caught in the revolving coupling, a suitable sheet-iron guard should be furnished by the pump builder. The guard should consist of a vertical shield, of a thickness not less than No. 16 gage; should be the full width of the motor base and have a semicircular top and be placed around the pump shaft between the inner bearing box on the pump and the hub of the pump coupling, with a circular hood built on the back of the shield which will entirely encase the couplings; the whole being split vertically with halves bolted together and rigidly connected to the baseplate, but so arranged that it readily can be removed.

The inside of the casings and the impeller should be painted with two coats of Highland non-corrosive paint or of some other approved acid-resisting coating.

Each pump should be furnished with a water-pressure gage having a $6\frac{1}{2}$ -in. dial and with a vacuum gage of the same dimension. This should be mounted on a suitable board for fastening to the pumproom wall. Piping to connect the gages with the pump should be

British Coal Exchanges A Popular Form Of Co-operative Effort

Eliminate Senseless Competition and
Clamor for Regulatory Legislation—New-
castle Exports Noted in 1325—Coal
Age Correspondent Urges Organization
at Norfolk on Old World Pattern

BY PAUL WOOTON

Washington Correspondent of *Coal Age*

GREAT BRITAIN has escaped any wave of popular clamor for anti-trust laws and legislation calculated to prevent "restraint of trade." As a consequence, that country enjoys numerous advantages flowing from united action. The wastes incident to senseless competition in bituminous coal are eliminated and the vitality of the industry is not drained in the same way as is the case in this country.

Despite the absence of statutes comparable to our Sherman and Clayton acts, no condition has arisen to cause even a suggestion that the industry be subjected to regulation of the public-utility type. It is true that there has come from labor the entirely unrelated demand for nationalization, but the severe defeat of that proposal has so impressed the labor party that it probably will be disinclined to risk its hard-fought gains on an issue regarded as unsound by a clear majority of the people of the kingdom. It may be said, however, that the issue is by no means dead.

COAL EXCHANGES AN OLD CUSTOM

A popular form of co-operative effort in the United Kingdom is the coal exchange. Even our Federal Trade Commission, with its electrically propelled, radio-directed and thoroughly modernized muckrake, could find no fault with this institution. There can be no restraint of trade at gatherings of buyers and sellers.

Exchanges are maintained at the principal coal centers. Most of them have been systematically conducted for generations, although, in fact, they date back centuries. The exchange simply is the outgrowth of curbstone gatherings. In Newcastle-on-Tyne in the old days, those having coal to sell, those desiring to purchase it, and those possessing the means with which to transport it met on the sidewalk outside the Guildhall. On the days when the weather was inclement the coal men would withdraw into the lobby of the building. The natural outgrowth of the proceeding was the establishment of an organized exchange.

The floor of the exchange is like that in most of our commodity exchanges but without any pit or platform features. Due to the frequent use which must be made of statistical records and other books of reference, a portion of the exchange floor at Newcastle is given up to the library. Telegraph and telephone facilities are maintained on the floor so that members need not leave the spot of actual trading in making use of those necessary adjuncts of the business. The manager of the exchange has an office on the second floor.

The Newcastle exchange is described as "the pivot upon which turns the whole of the coal and the shipping business of the ports on the Northeast coast." While the exchange is primarily devoted to coal, traders in other commodities are eligible for membership. As a result, a vast contract business is conducted there in coal, chemicals and non-ferrous metals.

The present exchange is in the old Guildhall. The building itself was erected before the discovery of America. There have been proposals to house the exchange more pretentiously but sentiment always has been strongly in favor of continuing to trade on the same spot where so much of the coal business of the Northumberland and Durham fields has been conducted for centuries. King Edward III in 1350 granted Newcastle a charter to work coal, but there are many earlier references to Newcastle as a source of coal. The shipment of coal from Newcastle to London was prohibited by a royal decree in 1306, when the King decided the best way to accomplish smoke abatement was to prohibit the use of coal. An old record shows that exports of Newcastle coal were being made to France in 1325.

The exchange is organized as a limited company, the common form of commercial organization. Principal authority for the conduct of the exchange is vested in a floor committee of five members, but, recognizing that the mainspring of the organization is the manager, a high-grade man is employed in that capacity. There are some 1,500 members. A requirement for membership is the purchase of a certain minimum amount of the company's stock.

BRITISH COAL SALESMAN AVOIDS TELEPHONE

At Cardiff the exchange occupies a large central court in a building in which most of the coal interests maintain their offices. It is under the immediate direction of a board of control and is conducted in much the same manner as the exchange at Newcastle. The popular hours are between eleven and one o'clock. During those hours the floor of the exchange is crowded. Few transactions in coal take place anywhere else. For a purchaser of coal to call at the office of the seller or even to inquire by telephone as to prices would be regarded as poor business. On the floor of the exchange buyers engage in what appears to be casual conversation with first one seller and then another. The buyer feels that he is in a more advantageous position to get the lowest price than would be the case were he to call at the office of a seller, thereby revealing the fact that he is anxious to buy.

While the larger operators usually are represented on the floor by a member of their staff, it is apparent that the contacts and the sociability of the daily gathering at the exchange is attractive to everyone, large and small, in the coal business. In addition to being a great stabilizing factor, important benefits flow from these personal contacts between all interests in the district. The problems of the industry are discussed and wider points of view obtained because of these intimate personal contacts. The ingrowing tendencies which come from being isolated day after day at one's own desk are overcome. Incidentally much clerical work is avoided. Most of the business, particularly at

Cardiff, is conducted on verbal understandings. Quite frequently large transactions are consummated without any exchange of written communications.

After seeing these exchanges in actual operation I am convinced that there should be a new effort to establish them in our coal centers. If such an institution were set up at Norfolk—probably the best place to try it out—full advantage should be taken of British experience. Coal men familiar with the territory tributary to Norfolk have expressed the opinion to me since my return that the management of such an exchange probably would have to be vested in a person well acquainted with the local situation.

While it probably would be impracticable to vest the management in an outsider, I do believe that arrangements should be made to bring someone from Newcastle

or Cardiff who is thoroughly familiar with the workings of the exchanges there. He could be engaged as an assistant manager. I have in mind the representative in Cardiff of a large coal interest, whose employers doubtless would be willing to give him a six-month's leave of absence for such duty, since it would familiarize him with American methods and contribute greatly to his value to the concern. He doubtless could be induced to accept, at a relatively low salary, the assistant managership of such an exchange. This would bring to the proposed institution all the facts which have contributed to the success of exchanges in Great Britain, and probably would contribute in no small way to the establishment of a permanent institution in this country which has promise of being particularly helpful to our coal trade.

Dangers Accompany Starting of Electric Mine Fans

Induction Motors Reasonably Safe—Ventilation of Fan or Fan Room with Non-Explosive Atmosphere Recommended Rather Than Permissible Fan Motor

PRESENTED with a question from Denver, Colo., on the dangers of an electrically driven exhaust fan at a mine giving off methane, members of the Coal Mining Institute of America at its meeting of Dec. 20 in Pittsburgh, Pa., proceeded to discuss quite generally the whole question of the dangers of mine fans, exhaust and blower, after standing or when running slowly or normally. Graham Bright, of Howard N. Eavenson and Associates, said sparking was not to be expected where induction motors, particularly of the squirrel-cage type, were used to drive the fan. It was difficult to conceive how motors of that kind could go so far wrong as to spark and ignite gas. Danger certainly existed where direct-current motors were used, because of the sparks on the collector rings.

BIG MOTORS CANNOT WELL BE MADE FLAME-PROOF

True, these could be enclosed, and satisfactory results be obtained with motors up to 20 hp., but he felt it would be difficult to provide in this manner for the safety of motors of 100-hp. capacity or over. Small motors might be so constructed that their use would be permissible in places where gas was occasionally present, but the manufacturers had found that the demand for permissible motors is not brisk, at least not at present. The controller, he added, could be put in an explosion-proof box and so prevented from communicating flame to the outside air.

Asked about the effect of power factor, he said that low power factor in the system would have no adverse effect. Low power factor in the motor itself might cause excessive current with consequent sparking in the controller. However, the controller might be inclosed in a box with a ventilating current feeding the box from some point so distant from the mine that the presence of methane at that point would be unlikely.

W. L. Affelder said that with an exhaust fan of the Sirocco or Capell type the gas could not enter the motor room, because the tendency of the fan was to remove the air from the motor room and the discharge was through a chimney. He later declared that with a disk fan this danger was, of course, to be feared.

J. W. Paul put an entirely different light on the subject by saying that the fan chamber and motor room might be full of gas prior to the starting of the fan and in consequence an explosion might occur even with a blowing fan. He suggested that the electrical parts be put in a casing whether explosion proof or not was immaterial. The casing might be connected with a compressed-air line. Then before starting the fan the air in the casing could be freed of its methanized air by the introduction of a blast of air from the compressor. Unfortunately, some compressed air, owing to the evaporation of lubricating oil, is not wholly free from explosive and combustible qualities.

Mr. Affelder said that when the fan was belt-driven the belt drew air into the motor room from the fan room and so created a risk. Joseph Williams, state mine inspector, of Altoona, Pa., said he preferred a steam-driven fan. With a steam turbine much uncertainty was removed.

Joseph J. Walsh, Secretary of Mines, State of Pennsylvania, said that in the anthracite regions there had been only eight stoppages of steam-driven fans in twenty years and that in a single year there had been an equal number of stoppages of electrically driven fans. Mr. King suggested that the steam-driven fans might not stop but might slow up to such a degree as to make dangerous conditions. Mr. Walsh declared that he had never heard of this happening. Someone said that steam-driven equipment sometimes began to run slow as a result of steam of low pressure being supplied to the prime mover. In that case the power was not thrown off the fan as in the case of the electrically driven equipment, which automatically slows down when the voltage is too low.

He recalled a case where a carpenter who entered the fan house at a gaseous mine in Colorado, after the fan had been stopped 30 minutes, fired the gas in that place with his open light. In the State of Indiana the gas in the fan house during the stoppage of a fan became so abundantly present that it formed a cap on the light of a safety lamp. There was always a danger that the gas would be ignited by the static electricity of the belt if the fan were belt driven.

L. C. Ilsley said that the U. S. Bureau of Mines had at no time recommended permissible motors for use on the surface. A separate motor compartment was preferable to the use of a permissible motor. M. D. Cooper said that before restarting the fan after a shutdown the motor room should be examined with a safety lamp as carefully as a working face.

News Of the Industry

Illinois Must Have Lower Wages or Lose Markets, Honnold Brochure Says

Expert Study Shows Non-Union Fields Have Cut Heavily Into State's Natural Trade — Operators Must Regain Control of Their Mines and Reduce Screenings

Illinois operators are staring at something this week. It is a picture of ruin, or something approaching it. The picture is conjured up in their minds upon reading a powerful document now in circulation from the office of Dr. F. C. Honnold, manager of the Honnold Coal Bureau, Chicago, in which a strong case is set up to prove that the state is fast losing its markets to non-union competing fields and that two things are necessary: (1) That miners' wages in Illinois be reduced, and (2) that a new agreement be made with the United Mine Workers by which control of Illinois coal mines will be regained by the operators from the union.

Graphic charts in Dr. Honnold's pamphlets to operators, miners and others interested in the coal industry of Illinois show that even though the production of Illinois has increased from 6,000,000 tons in 1880 to 60,000,000 tons in 1922, the increase in such competing states as West Virginia and Kentucky has been in far greater proportion, indicating that the non-union regions have been acquiring markets Illinois previously claimed as its own. The relative growth since 1880 of competing states is shown to be as follows: Illinois, 850 per cent; Indiana, 950 per cent; Kentucky 4,150 per cent; and West Virginia, 4,300 per cent. The working conditions of Indiana, bad as they are in comparison with those of non-union states, are shown to be markedly more favorable to the marketing of that state's coal than is true of Illinois.

The loss of Illinois markets during the past seven months is illustrated strikingly in a series of charts showing working time by states and time losses for all causes in Illinois and the five principal competing fields: Western Pennsylvania rail and river mines, northern and central Ohio mines, West Virginia Panhandle district, West Virginia Pocahontas field, and the Harlan County field of eastern Kentucky. In these seven months the "no market" losses were approximately these: Western Pennsylvania, 4 per cent; Ohio, 5 per cent; Panhandle, 7 per cent; Pocahontas, 2 per cent; eastern Kentucky, 4 per cent; Illinois, 45 per cent.

Attention also is directed to the in-

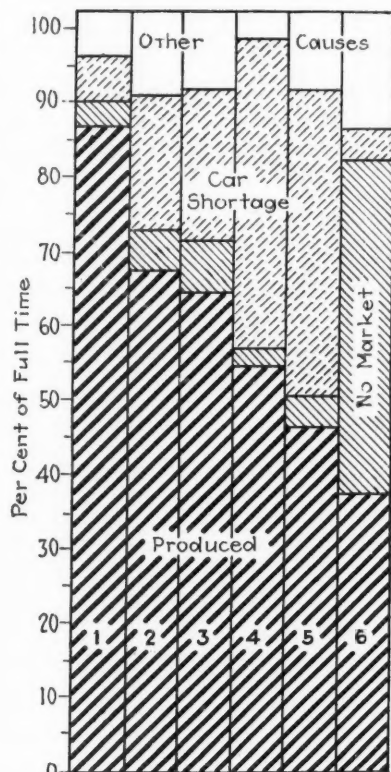
crease in the proportion of screenings produced in Illinois. This increase has been from 19.6 to 48 per cent between 1900, three years after the basis of paying miners changed from lump to mine-run, and 1923. Doctor Honnold estimates that this increase has caused a loss of between \$10,000,000 and \$12,000,000 a year to Illinois operators.

This is pointed out as "a condition wholly without justification but impossible of correction unless and until co-operation of the workmen is obtained. This co-operation is necessary both from the individual workman and from the union organization of the United

Mine Workers. It is a result of carelessness and indifference instead of the application of skill and interested co-operation" in spite of that clause of the agreement written in 1897 and continued to this day in which the union guarantees "heartly support and co-operation in disciplining any miner who, from ignorance or carelessness, or other cause, fails to properly mine, shoot and load his coal."

The screenings produced in Illinois through 2-in. round perforations (comparable to the 1½-in. openings in the bar screens used at the time the shift from lump to mine-run basis was made in 1897) have not "since April 1 of this year returned beyond 60 per cent of production cost." The average loss in only twenty Illinois mines has been 76.9c. per ton, or a total of over \$2,000,000. The average loss for 43 months from April 1, 1919, to Oct. 30, 1923, at the same twenty mines was 50c. per ton.

Such statistics as these, backed up by certain statements which Dr. Honnold makes in the pamphlets, are waking many Illinois operators to a clear realization of a situation which they have only dimly realized before. Most of them have had fragmentary knowledge of what confronted them as men in the business of producing coal, but this has served to crystallize their knowledge.



TIME WORKED AND LOST BY FIELDS
Diagram showing per cent of full time worked and time lost by causes, averaged for the seven months, April to October, 1923. The fields shown, one for each vertical column, are: (1) Western Pennsylvania rail and river mines; (2) Northern and central Ohio mines; (3) West Virginia—Panhandle district; (4) West Virginia—Pocahontas district; (5) Eastern Kentucky—Harlan County field; (6) Illinois.

Transportation Parley Called for Jan. 9

A national conference on transportation, to be held in Washington, Jan. 9, 10 and 11, has been called by Julius H. Barnes, president of the Chamber of Commerce of the United States. Two hundred leaders of recognized standing in commercial, educational, financial and industrial fields have been invited to take part in its deliberations and in the discussion of problems involved in the development of an adequate national transportation system. It is expected that every state will be represented at the conference.

"The expanding transportation needs of America can be easily visualized," said Mr. Barnes, "and must be resolved so that national wealth and individual production may be marketed into consumption. All production, agricultural and industrial, is dependent on adequate and ready distribution."

Coal-Mine Accidents Took 167 Lives in November

Fatal accidents at coal mines throughout the United States during November numbered 167 as compared with 153 in the previous month and 370 in November last year, according to a report by the U. S. Bureau of Mines. The fatality rate for the month was 3.29 per million tons, based on 50,783,000 tons of coal produced, as compared with 2.64 in the preceding month and 6.88 in November a year ago.

The year 1923 to the end of November shows a total of 2,254 coal-mine fatalities and an output of 593,000,000 tons of coal, the fatal-accident rate being 3.80 per million tons. The corresponding period in 1922 showed 1,813 men killed, 410,000,000 tons of coal produced, and a fatality rate of 4.42. Although in 1922 the five-months' strike reduced the number of men working in the mines, and thus also reduced the number of men killed, the cost of coal during the past eleven months of 1923, ton for ton, in number of lives lost, has been 14 per cent lower than in 1922.

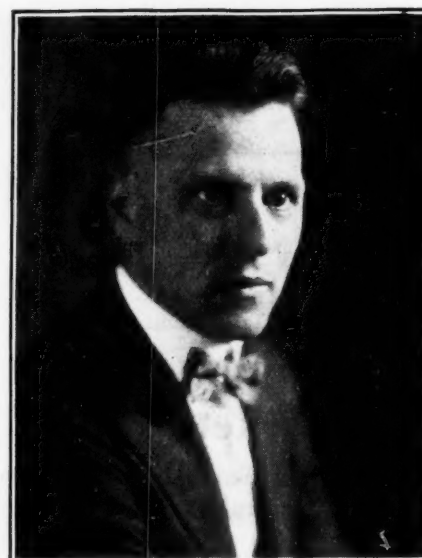
The reduced fatality rates for 1923 are evident in all of the principal classes of mine accidents. For example, falls of roof and coal, which usually account for nearly half of all fatalities at coal mines, showed a decline in the death rate from 2.01 per million tons in 1922 to 1.78 per million tons in 1923; haulage accidents, normally comprising about 18 per cent of all deaths at coal mines, showed a de-

cline in the rate from 0.73 to 0.64; the rate for gas and dust explosions fell from 0.75 to 0.61 in spite of three bad explosions during the past eleven months. The fatality rate for all classes of accidents to men working underground was 3.49 per million tons in 1923 and 4.03 in 1922.

Reorganization of Federal Departments Deferred

The proposal that the administration show its faith in the reorganization of the federal departments which it is advocating, by carrying into effect a part of the program by executive order, has met with delay. It is understood that administration leaders feel that the plan should be discussed with the joint congressional committee before any such action is taken. It has been impossible to obtain a meeting of the committee for that purpose. It is known that friction exists between members of the committee and their chairman. Whether or not this friction is such as to prevent an ultimate meeting of the committee has not been determined as yet. At any rate, it is believed that no transfer of bureaus will be made by executive order until further efforts have been made to discuss the matter with the congressional committee on reorganization.

Proposals to create a Department of Mines have failed to enlist the support of President Coolidge, according to a report from the White House. The President, it is said, does not look with



Dr. R. R. Sayers
Chief Surgeon, U. S. Bureau of Mines

favor upon the addition of another department to the government, but does feel that the present Bureau of Mines could be effectively strengthened and enlarged.

Incidentally the President took occasion to set at rest a persistent rumor that the Bureau of Mines was to be transferred by executive order from the Interior Department to the Commerce Department. The President, it was stated officially, has no thought of issuing such an executive order.

Coal-Mine Fatalities During November, 1923, by Causes and States

(Compiled by Bureau of Mines and Published by Coal Age)

State	Underground											Shaft				Surface					Total by States						
	Falls of roof (coal, rock, etc.).	Falls of face or pillar coal.	Mine cars and locomotives.	Gas explosion and burning gas.	Coal-dust explosions (including gas and dust combined).	Explosives.	Suffocation from mine gases.	Electricity.	Animals.	Mining machines.	Mine fires (burned, suffocated, etc.).	Other causes.	Total.	Falling down shafts or slopes.	Objects falling down shafts or slopes.	Cage, skip, or bucket.	Other causes.	Total.	Mine cars and mine locomotives.	Electricity.	Machinery.	Boiler explosions or bursting steam pipes.	Railway cars and locomotives.	Other causes.	Total.	1923	1922
Alabama.....	3		1	3									7													7	95
Alaska.....																										0	0
Arkansas.....																										0	0
Colorado.....	2	1										1	4													4	12
Illinois.....	3				2				1				8	1												8	10
Indiana.....	4		1	1	1							1	8													8	10
Iowa.....													1													2	3
Kansas.....	2					1							4													4	2
Kentucky.....	5		1										6												1	7	4
Maryland.....																										0	1
Michigan.....																										1	0
Missouri.....	1												1													0	1
Montana.....																										1	0
New Mexico.....	1												1													1	10
North Dakota.....																										1	0
Ohio.....	8		1				1						10									1				11	15
Oklahoma.....																										0	2
Pennsylvania (bituminous).....	15		4										19											1	2	21	117
South Dakota.....																										0	0
Tennessee.....	1		2										3													3	4
Texas.....																										0	1
Utah.....	1	1	2										3			1										4	2
Virginia.....						1																				3	2
Washington.....																										0	4
West Virginia.....	10	3	7	27		2		1		1			51											1	3	54	31
Wyoming.....	1	1	1										3													3	5
Total (bituminous).....	57	7	20	32	3	5	1	2		1			131	1		2		3	2	1	2		1	3	8	142	332
Pennsylvania (anthracite).....	12	1	3										3													25	38
Total, November, 1923.....	69	8	23	35	3	5	1	2		1			153	1		2		3	3	4			1	3	11	167	
Total, November, 1922.....	102	9	33	88	91	17	1	3		2			351	2		4		6	2	3	3		1	6	13		370

"Let Well Enough Alone" Probable Policy of Union and Operator Leaders

Disaster Seen in Wage-Negotiation Course Favored by Radicals of Either Side—Usual Period of Uncertainty Likely to Precede Agreement—Legislative Bugaboo May Figure

BY PAUL WOOTON
Washington Correspondent of Coal Age

Leaders of the United Mine Workers and among the coal operators alike are thought to be convinced that of all times next spring would be the worst possible time to have a bituminous-coal strike. There is every reason why, for their own welfare, these interests should let well enough alone and continue operation on the same basis during the next coal year as during this coal year. Nevertheless there are operators who are willing to go to the mat with the union in an effort to reduce wages. There is even a larger element in the United Mine Workers who would be willing to insist upon a six-hour day, a five-day week and a 20-per cent increase in wages.

To the operators who have a grasp of the general situation it must be entirely apparent that there is not a ghost of a chance to reduce the wage scale next April. To the equally intelligent leaders of the United Mine Workers it must be obvious that the application of the thirty-hour week and an increase in wage would simply lay their organization open to more disastrous non-union inroads than already have taken place. The union has lost its hold completely in the New River field. Its influence is all but gone in Kanawha. Throughout the whole northern half of West Virginia its strength is only one-half of that a year ago. For the union to insist upon extreme demands would be to invite ruin.

These facts are so well understood among the operators and among the mine workers who will participate in the wage conference that the logical thing for them to do would seem to be to agree promptly to extend the present agreement for another year. It is widely believed that this will be done eventually. It is doubtful if any such direct and businesslike result will be attained. A show of great determination to reduce wages must be made to appease the minority of operators who want to attempt the impossible. A sop must be thrown to the radical element in the ranks of the mine workers, so there will be a great display of demands known to be unobtainable. As a result, the usual three-months' period of uncertainty and dissension—in some ways nearly as bad as a strike—probably will precede this new agreement.

There is another reason for believing that neither side is going to precipitate a strike this year; Congress is in session. It is going to take all of the legislative influence of the operators and all of that of the union to prevent legislation, which neither wants, at

this session. Let there be a strike and the demand for this legislation will be such as to insure its prompt enactment.

There is one great temptation dangling before John L. Lewis. He knows that the federal government has formed a habit of interfering promptly when a strike is actually called. In such a situation he is at a great advantage. His capabilities are suited particularly to the masterful handling of such a pass. This was demonstrated anew during the recent anthracite strike, when labor entered the wage-scale conference with no hope of doing more than maintaining the *statu quo*.

If a strike is avoided, the chances seem to favor the passing of the session without coal legislation. The administration has shown no disposition to urge even the legislation recommended by the Coal Commission. Secretary Hoover is outspoken in his belief that the main remedy needed by the coal industry lies outside the legislative field. The operators oppose it. Labor opposes it. On the eve of a presidential campaign, Congress is more disposed to discuss such major issues as railroads, taxation, soldier bonus and immigration. These subjects have vote-getting potentialities far in excess of any coal legislation at a time when bituminous coal is not yielding pre-war prices and much of it is being marketed at an actual loss.

Big Snowbirding Deal Is Made in Illinois

For the first time, a large volume of Franklin County (Illinois) coal has fallen into the hands of an agency which will sell it direct to consumers by mail and otherwise. A contract is now in process of completion under which Simon Levy, a man who has grown in the coal business of the middle West until he now operates several direct-by-mail and direct-to-consumer companies, headed by the Boylston Coal Co. of Chicago, will receive the entire output of the two Franklin County mines of the Southern Gem Coal Corp. of Chicago. To gain control of this coal, Mr. Levy's interests have underwritten a Peabody Houghteling bond issue on the two properties—an obligation which has been embarrassing the Southern Gem corporation.

The details of the new contract between the Southern Gem and Mr. Levy remained to be cleared up at the end of last week. In one quarter it was expected that the contract would cover the output of the mines for five years. Mr.

Down Near Herrin

They've had a pleasant year in "bloody Williamson" County, Illinois, wherein lies Herrin, the town famous for the mine massacre of 1922. The coroner's annual report for 1923 shows sixteen murders, twenty deaths in mine accidents, ten suicides, eight deaths from undetermined causes and two from alcoholic poisoning. Just before Christmas a "dry" squad raided a list of drinking places, engaging in a gun battle in which a liquor defender was one of the principal defendants in the Herrin trial a year ago. Altogether an enjoyable time was had by all present.

Levy wanted ten. A certain running time and a certain price per ton were to be guaranteed the operators, but these were not announced. Mr. Levy said that his own selling organization would handle the domestic sizes, and that an arrangement would be made with the operators' selling department to market the steam sizes. It is probable the output of the two mines will total 1,500,000 tons a year.

This arrangement is expected to cause various changes of personnel in the Southern Gem Coal Corporation, but none of the other mining properties of the company is involved.

Must Commerce Department Abandon Statistics?

In view of the decree issued in connection with the cement manufacturers' case, the Department of Commerce has referred to the Department of Justice the question as to the propriety of collecting statistics such as are gathered by that department. While the decree in the tile manufacturers' case indicated that returns to a government agency are allowable, it is apparent that the effect of the department's figures is the same in many particulars as those handled by trade associations. The Department of Justice is understood to hold the position that it is contrary to the law for a trade association to submit figures to trade publications. In fact it is turning its attention at this time to associations which distribute their figures only in that manner.

Jan. 1 Coal Stock Report

A report to cover all coal stocks, as of Jan. 1, is to be issued by the U. S. Geological Survey. The Department of Commerce is co-operating in the gathering and compilation of the material, which will require all of the month of January. A report will be made available as soon after Feb. 1 as possible.

"The First Robin" Seen as Forerunner Of Forthcoming Soft-Coal Wage Parley

The following is reprinted from a recent bulletin of the Central Pennsylvania Coal Producers' Association:

"The prospect of coal legislation at the present session of Congress and the situation in the bituminous mines where part time operation is now the rule were discussed with President Coolidge today by John L. Lewis, president; Philip Murray, vice-president; Ellis Searles, editor of the *Journal*, of the United Mine Workers of America, and by Secretary of Labor Davis," states this morning's paper.

"The article says that the gentlemen representing labor declined to say what was discussed with the President and they had merely called to 'pay their respects.' The report says, however, 'the President's message to Congress concerning legislation and the matter of negotiations this winter between the bituminous operators and miners for renewal of the wage contract in the coal mines, which expires April 1 next,' were the topics talked about in this conference, with particular attention paid to that part of the President's message favoring the immediate establishment of a commission by the President, 'empowered to deal with whatever emergency situation might arise, to aid conciliation and voluntary arbitration, to adjust any existing or threatened controversy between employer and employee, when collective bargaining fails, and by controlling distribution to prevent profiteering.'

"Previous to this time the discussion of wage agreements in the union fields began with the joint conference of miners and operators representing the union districts.

"Discussions now begin by dire predictions of strike in the union fields, emanating usually from non-union operators in other states. One could not suspect in such cases that 'the wish might be the father to the thought.' This unselfish devotion of non-union coal operators to the country's good during strikes in the union fields is most inspiring. That such condition enhances the value of their coal greatly, and therefore their profits, of course has nothing to do with their concern about the possibilities of a strike in the union districts.

"As 'the first robin is a sign of spring,' so we must take these signs as forerunners of an interest in our forthcoming negotiations, stronger than mere curiosity.

"Irregular operation of mines arises from a great many conditions, all of which have been discussed at great length by coal operators and coal miners, as well as experts and near-experts of every variety during the past five years. The one great cause of irregular operation in the union fields is the ability of the non-union fields to produce coal at a lower cost than the

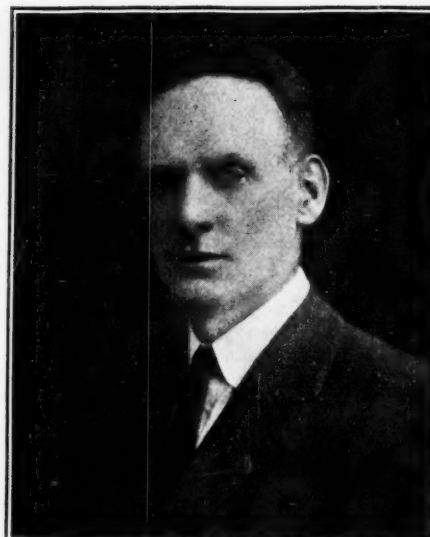
union mines. Their business is more profitable and moreover is always profitable, made so at the expense of the wage schedules. This fact has tended to increase the development of the non-union fields more rapidly than the country required. It will continue to cause overdevelopment in the non-union fields so long as the union is able to maintain a wage schedule so much higher than the non-union wage schedules as to insure non-union mines a profit.

"So far as we know, the union coal operators have not been consulted as to their necessities following the termination of the present wage agreement April 1 next. Neither do we think it important that they be consulted.

"It is important, however, that the United Mine Workers of America should understand that unless they are able to establish conditions in the union fields of this country where the coal operators and the coal miners in such fields can compete for the business of the country upon a fair basis with the coal operators and coal miners of the non-union fields, any continuation of the present basis means ruin to many union coal operators and continued idleness to thousands of union coal miners during the coming year.

"If the policy of the government as indicated by various statements and decisions and reports of different governmental bodies is to eliminate the uneconomic coal mines of America by establishing car rules, etc., so as to accentuate the natural law of competition, the union may as well understand that the present policy of wage-scale making and enforcement means that all of the union mines in the fields where keen competition now obtains as against non-union mines may be listed as uneconomic. Operating conditions in the union fields are just as good, just as efficient, the quality of their coal is just as high (and, if we believe the Union, labor more skilled) as compared with the non-union fields. As between mines where natural conditions are equal, union mines will be wiped out as a result of unfair competition and not the mines that are naturally uneconomic. The union miners must come to understand this: if they are going to have work and their union is going to continue to be a strong force in their lives, they must bear their share of the burden of contest during the struggle 'for the survival of the fittest.'

"Non-union operators competitive with and contiguous to central Pennsylvania have already cut wages 25 to 35 per cent. The reduction, as made, affects a large volume of tonnage, probably five to six million tons per annum. More reductions, in our opinion, will follow in the non-union fields, the day when union coal operators have been safely signed, sealed and delivered by another agreement."



Harrison D. Mason

Recently re-elected secretary-treasurer Coal Mining Institute of America.

Taylor Coal Co. Takes Over Bickett Mines

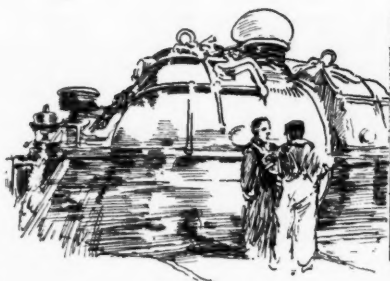
The Taylor Coal Co., of Chicago, has acquired the Bickett Coal & Coke Co., effective Jan. 1. By the merger the Taylor company takes over the properties of the Franklin Coal & Coke Co., at Royalton, Ill., and the Chicago & Sandoval Coal Co., at Centralia, Ill., which will practically double the output of the Taylor company to 15,000 tons per day.

Three mines are involved in the transaction, two at Royalton and one in Christian County. The Royalton mines have a daily capacity of approximately 5,000 tons. Extensive improvements are planned at Royalton, Mr. Keeler, manager of sales of the Taylor company, announced.

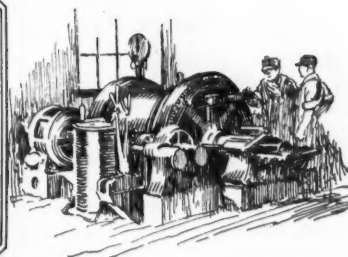
C. A. Bickett, former president of the Bickett Coal & Coke Co., will become a director of the Taylor Coal Co., and Ray Jones, sales manager of the Bickett concern, also will join the sales organization.

A Two-Foot Hole

A hole barely 24 in. in diameter was the aperture through which death came to the three men killed in the recent flooding of the Radium mine of the Aluminum Ore Co. of America near St. Louis, Mo. A drill broke through into an old water-filled working whose proximity was unguessed and a sufficient flood of water and gas came through to drown the mine. Two pumps are now throwing 8-in. streams out of that mine and must continue for an estimated sixty days before mining can be resumed. Nearly 200 men are thrown out of work for that length of time. The cost to the company is great. All because of careless mapping—and a 2-ft. hole.



Practical Pointers For Electrical And Mechanical Men



How Underground Substations Should Be Ventilated to Obtain Full Rating

In the modernly equipped non-gaseous mines of the present day, purchased power seems to have proved the most economical and efficient, due to the fact that the required operating voltage may be maintained at the working face of the coal and also the usual power-house expense and troubles eliminated; hence the underground substation is rapidly taking its place in the industry.

Although these substations are originally installed at or near the working face, before long the mine has developed a considerable distance from the point where the substation was located, and as most of these isolated stations are equipped with automatic reclosing circuit breakers for the control of the direct-current side, an operator is not required. Therefore the substations are practically forgotten until development of the mine has advanced to such a point that the voltage drop is again realized, and the substations must be moved nearer the workings. Long before this condition arises it is probable that the paths of ventilation will be changed, the fans moved closer to the workings, etc.; therefore the path for ventilation that was originally provided for the substation will be badly crippled or blocked entirely. As a result the motor-generator set or converter—whichever may be employed for converting the alternating current into direct current—must pay the first penalty, the second being paid by the

maintenance man in charge of the equipment, and the third by the operators of the mine.

While nearly all manufacturers of electrical machinery design their apparatus to generate its own ventilation, this provision is far from ample when no supply of fresh air is available; in fact it is of no practical help, as it only circulates the same volume of air through the machine again and again. Therefore a means must be provided to circulate a much greater volume of air.

Referring to a condition that I believe will serve as an average experienced along such lines: The room temperature at 7 a.m. was found to be 60 deg. F., as the machine had been standing idle since 4:30 p.m. of the day before. This machine was a Westinghouse synchronous converter having a capacity of 150 kw., 275 d.c. volts and an allowable temperature rise of 55 deg. C., and an additional 5 deg. rise, at the commutator and rings, as well as an allowance for 100 per cent momentary overloads without damage or excessive temperature rise, but at no time did the machine accommodate a peak load of more than 51 per cent while the temperature conditions were under test.

At 7:15 a.m. the converter was started and thrown on the line, and the results of tests taken throughout the day are as follows:

Time	Room Temp.	Field Surface Temp.
9:15 A.M.	74 deg. F.	81.3 deg. F.
10:15 A.M.	82 deg. F.	89 deg. F.
12:15 P.M.	96.5 deg. F.	116 deg. F.
3:15 P.M.	109 deg. F.	163 deg. F.
4:20 P.M.	110.5 deg. F.	176 deg. F.

Thus the armature and field insulations were being rapidly destroyed, commutator burned, brushes damaged and the general efficiency of the machine greatly lowered.

By experiment it was learned that the air in this station must be replaced one and one-half times each and every minute to relieve this condition in a satisfactory manner. The dimensions of the room were 11 ft. x 17 ft. x 10 ft. 6 in.; hence, approximately 1,963.5 cu.ft. of air was contained in the room, which would require a fan capable of removing $1,963.5 \times 1.5 = 2,945$ cu.ft. of air per minute. The nearest to the requirements just determined was a Venturi exhaust fan, listed by the Westinghouse Electric & Manufacturing Co., of East Pittsburgh, Pa. The capacity of the fan

selected was 3,250 cu.ft. per minute, this being nearest to the requirements.

The fan just mentioned is direct connected to a direct-current motor of the series-wound type with a speed of 900 r.p.m. having a full load current of 0.11 amp. at 275 d.c. volts. This fan was connected through suitable fuses to the direct-current terminals of the converter; therefore it does not remain idle during the moments that the d.c. circuit breaker may be open, nor is it subjected to the full-line voltage while starting, as the fan attains its maximum speed as the voltage of the converter builds up to its maximum, considering that most all small converter units are started from the alternating-current side of the machine.

The maximum temperatures after the fan was placed in operation are as follows: At 4:20 p.m., room temperature, 64 deg. F.; fields, 98 deg. F.

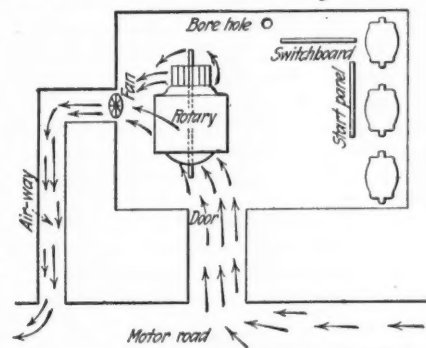


FIG. 2—PROPERLY VENTILATED SUBSTATION AND CONVERTER

After the fan was installed the air in the substation was changed every minute and a half. The circulation of air through the converter allowed the machine to be operated to its full capacity without any damage or danger of overheating.

Prior to the time this fan was put in service, the average life of a grade No. 619 National Carbon Co. brush for the d.c. side of the converter was 46 days, but since the fan was put in service the same grade of brush shows only 9/32 in. of wear after seven and one half months of service.

From this data it may readily be proved that in only a short period of time the brush savings alone will pay the cost of the ventilating fan plus the labor required to install it.

The accompanying illustrations show the natural ventilation before the fan was installed and the air currents after the fan was installed.

ROYCE L. GRIMES,
Electrical and Chemical Engineer.
Piney Fork, Ohio.

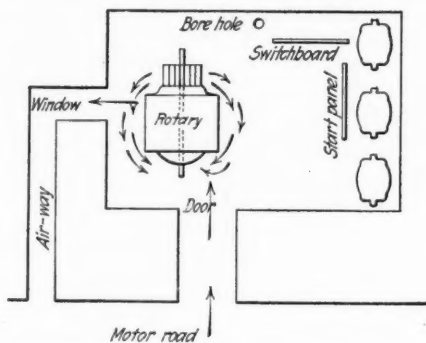


FIG. 1—VENTILATION BEFORE FAN WAS INSTALLED

The same air was continually circulating through the converter and thus causing a gradual increase in temperature until it became a detriment to the insulation, commutator and brushes, also cutting down the capacity and efficiency of the machine.

Combustion Control and Best Boiler Practice

Will you please give me solutions to the following questions:

(1) In a certain plant coal having a heat value of 14,000 B.t.u. per lb. is used. If the flue-gas temperature was 450 deg. above the air in boiler room, and 25 lb. of air was supplied per pound of coal, what percentage is lost in stack gases? The specific heat of chimney gases is 0.24.

(2) What gas in large proportions in chimney gases indicates insufficient air being supplied to the fuel?

(3) What gas in the chimney indicates that too much air is being supplied to the fuel? What proportion of this gas is good practice?

(4) What instrument is commonly used to test flue gases?

(5) How is the condition of the boiler indicated by a change in temperature of the chimney gases, and why?

Chicago.

C. E. PETERSON.

(1) The precise answer depends upon the analysis of the coal, for if 25 lb. of air per pound of coal is supplied, the weight of flue gases per pound of coal will be this amount of air plus the carbon or other elements which are added to it. If the coal were 100 per cent carbon, the amount of flue gas per pound of coal would be 26 pounds and the heat lost under the conditions named would be 20 per cent. This condition, of course, never exists in actual practice, as there always is a certain percentage of ash and hydrogen. The latter element burns to water and is not shown in the analysis of flue gas for which the samples are collected over water.

(2) CO, when present in any amount always indicates insufficient air. High percentages of CO₂ also are likely to be accompanied by a certain percentage of CO.

(3) Oxygen, of course, indicates air which has not been used in combustion. It is always necessary to supply air in excess of that theoretically required. In present-day practice 6 to 8 per cent. of oxygen, depending upon whether the boilers are hand or stoker fired, would indicate good practice.

(4) The instrument commonly used is what is known as the Orsat machine. This apparatus consists of a burette graduated up 100 c.c. and surrounded by a water jacket. This burette is connected to a manifold, which in turn is connected to three or four pipettes containing various reagents for the absorption of different elements in the gas. These pipettes are in turn connected to rubber bags which permit the gas permanently in the rear half of the pipette to pass out of the pipette to permit the introduction of the gas to be analyzed into the front bulb of the pipette. Each one of these pipettes is provided with a stop cock to shut it off from the manifold. The burette also is provided with an opening to which is connected a three-way cock,

one opening in this cock connecting to the tube through which samples are drawn and the other for discharging analyzed samples to the atmosphere. At the bottom of the burette is placed a connection for a rubber tube to the end of which is connected an open bottle.

The method of using an Orsat is to fill the burette with water, open the three-way cock to the sampling tube and draw a sample of gas into the burette by permitting the water therein to flow into the bottle connected to the bottom of the burette. Exactly 100 c.c. is drawn off after two or three samples have been drawn and rejected so as to be sure to get the proper sample from the boiler. The sample is then passed into the first pipette, which contains a solution of caustic potash for the absorption of carbon dioxide, by raising the water bottle, which causes the water to flow into the burette and displace the gas sample. After being permitted to remain in the pipette a sufficient length of time, the gas is returned to the burette by lowering the water bottle, and the amount of gas remaining is determined. The difference between this amount and the original 100 c.c. represents the carbon dioxide absorbed in the first pipette.

The second pipette contains an alkaline solution of pyrogallol for the absorption of oxygen and the remaining pipette or pipettes contain an acid solution of cuprous chloride for absorbing the carbon monoxide. The process of absorbing and measuring the oxygen and the carbon monoxide is the same as that described for absorbing and measuring the carbon dioxide. After the three reactions have been performed, there will be considerable volume remaining, which is nitrogen.

(5) Increasing temperatures of the chimney gases indicate that the boilers are dirty, either internally or externally. Scale or soot existing on boiler tubes decreases the flow of heat through the boiler tubes and therefore makes the boiler less efficient and the temperature of the chimney gases high.

Information on Heating of Electrical Conductors

Answering the recent inquiry on heating of conductors in your paper, we feel we cannot do better than give you below the report of our research engineer on the subject of heating of conductors in conduits:

"We have no data here giving methods for computing the proper current-carrying capacity of single conductor cables for 3-phase a.c. when in iron or steel conduit. The problem is not possible of purely mathematical solution. The chief difficulty is the calculation of the induced current in the conduit due to the current in the copper conductor.

"The information desired can be obtained only by a long experimental investigation. About the only thing one can do is to calculate the current along the lines suggested and then use

a factor which will give a fair degree of agreement with actual practice. This factor will be less than one, and is obtained by dividing what is considered the proper current by the computed current.

"With reference to the specific problem cited, if the 1/0 A.W.G. conductor was alone in the conduit, it might just meet the limit in temperature. Also, this will be influenced by how close the other conductors will be."

THE OKONITE CO.

Installing Cables in Shaft

With the more general use of alternating current for power transmission in the mines and the use of voltages greater than 440, much more consideration must be given to the shaft cable.

These cables should rarely be installed in the main hoisting shaft because of the difficulty of installation, maintenance and likelihood of accident. Whenever possible, the cable should preferably be placed in a separate borehole. A serious objection to the cable being placed in the shaft is the liability to damage from being cut by pieces of coal or damage caused by accidents with the hoisting cage in the shaft.

When cables are installed in a shaft, joints are among the most important items to be given attention. A good joint should be mechanically strong and water-tight. Joints should never be made directly in the shaft unless absolutely necessary, because of the danger in working upon them and the greater liability to breakdown.

A better arrangement is to have the cable continuous from the top of the shaft to the bottom or ordered in sections of such length that the joints may be made at the different shaft levels or veins. Whenever the joint must come in the shaft it is advisable that it be made in an inset in the shaft for the purpose; then the workmen will be in a better position to do a good job and still not be in any great danger.

Joints should be made only after the two cable ends have been securely anchored, the anchorage being designed in accordance with the type of joint. If the joint is of sufficient strength to take the weight of the cable the anchorages may be removed when the joint is completed, but usually some form of support must be maintained for the cable.

One lb. carbon oxidized with perfect efficiency equals:

11,325,000	ft.-lb.
14,600	heat units.
1.11	lb. anthracite coal oxidized.
2.5	lb. dry wood oxidized.
22	cu.ft. illuminating gas.
4.275	kw.-hr.
5.733	hp.-hr.
15.05	lb. of water evaporated from and at 212 deg. F.



Problems In Underground Management



Dynamite Unquestionably Exerts Its Force Equally in All Directions

Tests Show Guncotton Exploded Makes Holes of Same Size Whether
Placed Below or Above Plates of Steel—With Lead
Blocks Pressures Proved to Be Equal

By J. E. CRAWSHAW
Explosives Engineer, U. S. Bureau of Mines, Pittsburgh, Pa.

"Dynamite acts down and black blasting powder acts up," is a statement frequently heard around the mines and from men whose practical observations may seem to warrant their making the statement. Nevertheless those who have studied and tested explosives are convinced that it is an erroneous opinion, arising from a failure to consider all contributing factors.

Tests showing that the force is equal in all directions are simple and easily made, and many explosives investigators have performed them. Before presenting these tests it might be well to consider one or two cases of the use of such explosives which often lead the unwary falsely to conclude that dynamite does not exert an equal disruptive force in every direction:

TWO MISLEADING INDICATIONS

(1) The use of dynamite in the form of an "adobe" or "mud-capped" shot where a mass of explosive detonated on a rock shatters it into many pieces, the broken rock which before the explosion was below the dynamite being the only visible result of the explosive force released. In discussing this action no consideration usually is given by mining men to the force expended on the surrounding air.

(2) The action of dynamite in "brushing" the roof of a coal bed, the explosion throwing out shattered pieces of rock, leaving a crater in the immediate vicinity of the charge. An explosion of black blasting powder will, on the other hand, break the rock upward and outward from the charge, bringing down a large mass of the rock. The difference in the result is not due to the fact that the one shoots up and the other shoots down but that the gases from the one are more rapidly developed than those from the other and so have time to penetrate the cracks and fissures before the rock has given way along the lines of least resistance.

Reply to question on this subject delivered at Dec. 19 meeting, Coal Mining Institute of America.

Dr. Charles E. Munroe conducted a test in which he placed disks of guncotton against plates of iron and steel. The holes made by the explosion of the guncotton were of the same size regardless of whether the disk of guncotton was placed above or below the metal plate. This is convincing proof that high explosives exert their power equally in all directions.

At a later date Dr. Walter O. Snelling extended the method of Dr. Munroe; but instead of measuring the forces by the size of the holes in iron plates, he

used the compression produced in small lead blocks. In each trial the explosive and lead block were held rigidly in position. In the first two tests with each kind of explosive the charge was placed above the lead block, while in the other two tests the charge was placed below the lead block, so that the downward and upward pressures were measured, respectively. A measurement of the four blocks used showed equal compression in each instance.

In the practical use of explosives, however, this force which is applied equally in all directions acts against unequal resistances and the effect obtained in any one direction can be equal only to the resultant of the resistances which act in the opposite direction. As soon as the confined gas is released, the force no longer acts. It is evident therefore that when the explosive is not exposed on all sides to an equal resistance the results of blasting may be such as to cause a ready misinterpretation of the real action of the explosive.

Apportioning Working Places To Miners by Lot

By ALFRED JONES
Wheeling, W. Va.

Places in the coal mines are often of extremely unequal desirability and that fact permits, and in truth invites, the rankest kind of favoritism on the part of the foreman who distributes them. Even where the foreman means to treat all fairly he is faced by the fact that he has no clear basis on which to decide who is entitled to the better places and so frequently he yields to the loudest clamor, to some personal preference in regard to the claimant or perhaps to the solicitation of someone related to him or a near neighbor.

In the Durham mines of the north of England the working places are distributed by lot. The system is known as cavilling. That this plan is popular is evidenced by its long continuance. Every man feels he has an equal chance and almost all of them accept their lot and are satisfied to plod along in the place afforded till the next drawing. Of course, if a man does not like his place he can leave the mine but this he rarely does.

With this arrangement the charge can no longer be made that the mine foreman is paid for the better places. To accuse a boss of taking money for

that purpose generally results in the miner being fired on the spot. Nevertheless men do pay \$50, even \$100, for a good place. Foreigners just arrived, not considering the giving of money for this purpose to be wrong, are quite willing to pay that much cash for an advantage which will enable them in a short time to recoup themselves for the expenditure.

Not only are men sometimes favored who pay the boss money but men are removed for not paying it. To excuse his action a foreman will give some reason having little foundation in fact. He will declare that the place "is going too slow" or that the man "is loading dirty coal" or he may curtail the miner's turn of cars. A favorite scheme, however, is to give the man a partner he doesn't like hoping he will quit rather than work with him.

In the system allowing men to choose their places by lot two men may ask the foreman to permit them to exchange places because, for various reasons, some men like places that others dislike. The change is then beneficial to both. The only disadvantage of the English custom is the loss of time when the men change their working places. However, that rarely exceeds a half a day and no manager will begrudge that time if the men by reason of the arrangement are made content.

Discussion

Some, at Least, Were Quizzed In Presence of Gas

With indignation I read a letter written by a superintendent in the Dec. 6 issue of *Coal Age*, page 863, in which he criticized the work of the Board of Examiners at the last examination of mine foremen and firebosses and questioned the validity of the certificates issued by them. He no doubt refers to the examinations held this summer at two of our mine schools.

I happen to know much about the routine and character of the work performed at State College this summer, where a class of about fifty men were preparing themselves for certificates, and I must say that, judging from the way these men worked and the completeness of their instruction, I do not see how anyone can question their qualifications and ability to perform the duties of any appointment within the range of their certificates.

The mining law was taught and discussed most thoroughly and frequent oral tests showed that the students had a good conception of what the law means to the mining man. "Superintendent" says that candidates for fireboss certificates were not submitted to an oral examination. Those who believe that are certainly laboring under a false impression. I will admit they were not examined inside a mine, but the law reads that candidates for certificates "shall also have undergone all oral examination in the presence of explosive gas," which examination they did take in a chamber containing gas of that character.

By a regular course of lectures, demonstrations and tests the men were taught the construction, advantages and disadvantages of the principal types of approved flame safety lamps. They also were given demonstrations of the action of these lamps in a gaseous mixture. Let me add that at considerable expense and loss of valuable time these men took advantage of these courses, and they should be given credit for their enterprise. M. S. L.

Joseph J. Walsh, Secretary of Mines, State of Pennsylvania, in a letter dated Nov. 23 to James T. Beard, says: "The examining boards under the new act, as under the old act, have authority to make rules for the conduct of the examinations. The new act, though it omitted the clause regarding the oral examination in the presence of explosive gas, gives the boards authority to make the examinations as thorough as they desire."

This disposes of the question as to whether examinations omitting the oral examination of the applicant in the presence of explosive gas are valid or

invalid. They are distinctly valid, but the question whether they fill the need is still to be answered. In truth, the examination of firebosses is both a mental and a physical test. The fireboss may be clever, responsible and well instructed enough for the job but if he cannot see a cap on a lamp, cannot distinguish it when caused by small percentages of gas, then he is not a fit man though he had all the knowledge in a mining pocketbook or all the wisdom of the oldest fireboss in the industry or had a medal for long and faithful service. When will it be learned that no college or school can endow a man with powers of color perception or grow an arm on the stump of a one-armed man?—EDITOR.

Will Classroom Examination Fill the Bill?

No one can effectually examine the qualifications of a fireboss anywhere but in a mine, and for this reason I believe that the reader signing himself Superintendent in *Coal Age* of Dec. 6 performed a public service in calling attention to the importance of hewing close to the line laid down in the Bituminous Mining Law of Pennsylvania.

After many conferences and prolonged discussion with mining engineers and mine officials, the mine inspectors of the bituminous region of Pennsylvania, under the leadership of the late James R. Roderick, then chief of the Department of Mines, at Harrisburg, submitted to a committee of the State Legislature a complete and comprehensive draft of what they considered would make a thorough revision of the mining laws then on the statute book.

This entire revision was promptly enacted by the Legislature sitting at that time and approved by the Governor of Pennsylvania, June 9, 1911. The revised law has generally been conceded to be a model and many of its features have been incorporated in the mining laws of several of the states. Notwithstanding, there have since been made a number of revisions of different sections, as suggested by the changing conditions and requirements in the mines.

Until the present year, May 31, 1923, applicants for fireboss certificates were supposed to be given an opportunity to demonstrate their ability to detect a flame cap in a safety lamp exposed to an explosive mixture of gas and air. It may be assumed that some of the examining boards misinterpreted the meaning of the expression "oral examination in the presence of explosive gas."

Though some of the boards took their applicants for fireboss certificates into the mines and subjected them to the

practical test, other boards may have employed means of making this test by exposing a safety lamp to an explosive mixture of gas and air in a chamber or box, on the surface, the apparatus being provided with a window through which the action of the lamp flame could be observed by the candidate. Still other boards may have satisfied themselves of the ability of the candidates to perform the duties of fireboss in gaseous mines without putting them to the practical test.

This difficulty appears to be the only reasonable excuse for the dropping of this clause when Art. 24 was revised in its entirety by the last legislature, and approved by Governor Pinchot, May 31, 1923.

There are many firebosses now employed in making the test for gas in bituminous mines who fail to detect the presence of gas until the mixture has reached 2½ or even 3 per cent. This is largely due to failing eyesight, and in some instances color blindness may be the cause. The danger of this condition is easily recognized when it is remembered that 1 per cent of gas or less is extremely dangerous in the mining of a soft inflammable coal.

How Ohio Lost an Output Of Six Million Tons

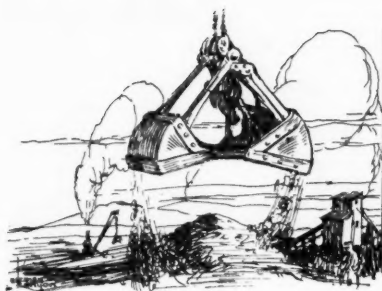
Diversion of business by the government and shipment of inferior grades of coal into Ohio from the "crescent" has cost the southern Ohio operators the loss of much of their Ohio business is the conclusion of W. D. McKinney, secretary of the Southern Ohio Coal Exchange.

Mr. McKinney points out that the demoralization of the district is due primarily to the federal government's war orders compelling Ohio producers to ship their entire output to the Northwest. The loss this year is more than 6,000,000 tons in production.

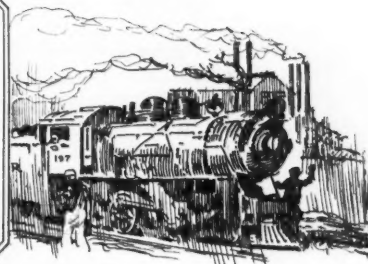
"The severely cold winter of 1917-18 found the country short of fuel, particularly the Northwest, and the U. S. Fuel Administration directed that all the domestic coal of southern Ohio be directed to that section," Mr. McKinney said. "Practically every pound of screened lump produced in this field was taken away from the operator's trade in Ohio, Indiana and Michigan and sent to the lakes, where it was transhipped to the Northwest."

"This opened the Ohio retail field to the Crescent district, south of the Ohio. There are few laws that govern grading of coal in this district, with the result that people of Ohio burned inferior and dirty coal, in the majority of instances, not knowing its source. Consequently coal from the southern Ohio district was given, figuratively speaking, a 'black eye.'"

Mr. McKinney said further that coal from the Hocking, Pomeroy, Crooksville and Jackson districts of southern Ohio is equal for general domestic and steam purposes to coals of the same rank produced in West Virginia.



Production And the Market



Weekly Review

The anticipated slump in the anthracite market arrived on scheduled time. Demand for all sizes fell off and independent coals was quoted last week, in many instances, as low as at any time in 1923. Although there was a heavy cut in production due to the holiday season, there was sufficient coal on hand to meet all needs. Movement of premium coal is more difficult and producers and shippers of independent product are looking for orders. Despite the dullness of the soft coal market there is a distinctly better feeling as the new year opens. Inquiries for both contract and spot coals are more numerous and buyers generally show indications of adding to their present reserves.

Coal Age Index as of Dec. 31 shows an advance of one point to 179 over the previous week. The corresponding average price was \$2.17. Slight increases in Mt. Olive, Standard, eastern and western Kentucky, Clearfield, Cambria-Somerset, Kanawha and Pocahontas districts were partly overcome by decreases in southern Illinois, Springfield and Indiana coals.

Production Takes Upward Turn

Output of soft coal increased to 10,545,000 net tons during the week ended Dec. 22 according to the Geological Survey, an advance of 607,000 tons over the previous week's production. In the corresponding week of 1922 the output was 10,138,000 net tons. Soft coal production for 1923 to Dec. 22 stands at 537,143,000 net tons, which is 117,370,000 tons ahead of the average production for 1919, 1921 and 1922, and 19,251,000 tons behind the average production of 1917, 1918 and 1920, the years of activity.

The holiday season affected the midwest markets last week. There was no action in domestic coals and little demand for steam sizes. While many mines closed down during the week between Christmas and New Year's, production exceeded the demand. The trade at St. Louis is doing little business in the cheaper grades of coal, but there is no demand for anthracite, smokeless coals or coke. Little activity is reported from

Kentucky, Duluth or Milwaukee. Buying is quiet in Ohio and the Pittsburgh district market continues in poor shape. An extremely quiet market is reported from New England, with buying and receipts in light volume.

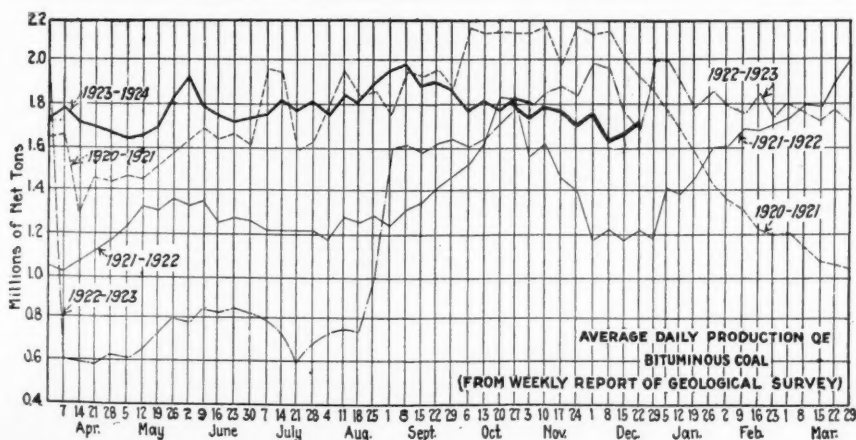
The anthracite market lost much of its snap last week. While there is a good market for stove and chestnut coals the demand for the other sizes, with the possible exception of barley, is not active. Egg coal is in over supply with some shippers. Pea coal is rapidly accumulating and it was said that some of the larger companies were willing to make concessions to keep it moving. Quotations for this coal ranged as low as \$5.50 at Boston while the markets at New York and Philadelphia ranged around \$6. Cancellations of orders for high-priced coals are being received from Long Island and sections of New England. Output of anthracite amounted to 1,990,000 net tons, during the week ended Dec. 22. This was a decrease of approximately 23,000 tons when compared with the previous week.

The export market was quiet. Some inquiries were reported but comparatively little new business was reported as closed. Freight rates remained high. A slight increase in foreign business was reported at Hampton Roads. Dumpings for all accounts at Hampton Roads during the week ended Dec. 27 were 357,110 net tons, an increase of 1,183 tons when compared with the previous week.

Midwest Market Dormant

The week between Christmas and New Year's struck little life into the coal trade of the Midwest region. Domestic sizes of everything were without action and steam sizes were in light demand. Regardless of the fact that dozens of mines in Illinois, Indiana and Kentucky shut down before Christmas and expected to stay down until some day early in 1924, production was too great for the market. Cold weather seems to be a necessity if the trade in this region is to rise from the dumps.

Franklin county lump, rated at \$3.75 since the price drop



Estimates of Production

(Net Tons)

BITUMINOUS

	1922	1923
Dec. 8.....	11,495,000	8,929,000
Dec. 15 (a).....	10,667,000	9,938,000
Dec. 22 (b).....	10,138,000	10,545,000
Daily average.....	1,690,000	1,757,000
Calendar year.....	397,737,000	537,143,000
Daily av. cal. year.....	1,319,000	1,786,000

ANTHRACITE

Dec. 8.....	2,075,000	1,899,000
Dec. 15.....	2,237,000	2,013,000
Dec. 22.....	2,065,000	1,990,000
Calendar year.....	53,095,000	93,961,000

COKE

Dec. 15 (b).....	299,000	241,000
Dec. 22 (a).....	281,000	251,000
Calendar year.....	7,770,000	17,694,000

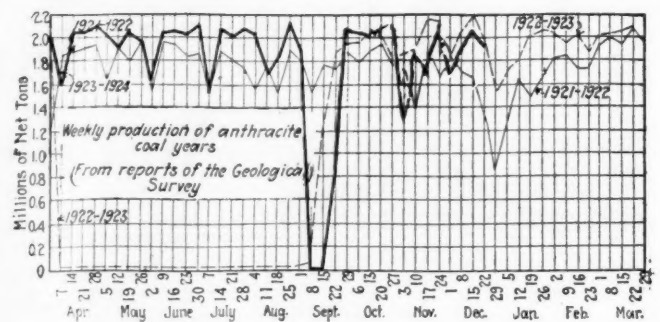
(a) Subject to revision. (b) Revised from last report.

of Dec. 6, has softened until it is hard for association members to sell in the face of independent competition at \$3. Middle sizes have been selling at almost any price and screenings, though not in great volume, have sold in transit as low as \$1.20 though quoted at \$1.90 on the circulars. Central Illinois lump is soft at \$3 and screenings from that region waver from \$1.25 to \$1.50. There is little eastern coal coming into this general territory just now.

The usual holiday depression covers the entire Southern Illinois field and everything is quiet in Williamson and Franklin counties, with a little demand only for screenings and small nut. All mines have a surplus of domestic sizes and cutting the price does not seem to move them any. Railroad tonnage has eased up. Idle mines have strings of empty coal cars on their sidings and the tonnage loaded and billed moves promptly. Somewhat similar conditions prevail in the Jackson and DuQuoin fields.

St. Louis Trade Drags

Business is still dragging in St. Louis with weather above freezing. As a matter of fact, no season up to the present has equaled the end of 1923 for warm temperature. The



trade seem to be doing a little business for cheaper grades in smaller quantities and the finish of the year will be quiet, with practically no coal moving. There is no demand for anthracite, smokeless or coke and the higher grades of midwestern coals.

There is very little activity in the Western Kentucky fields, as most of the mines are reported as down with the idea of staying down until Jan. 2 or Jan. 7. Demand for

Current Quotations—Spot Prices, Bituminous Coal—Net Tons, F.O.B. Mines

Low-Volatile, Eastern					Midwest						
	Market Quoted	Dec. 26, 1922	Dec. 17, 1923	Dec. 24, 1923		Market Quoted	Dec. 26, 1922	Dec. 17, 1923	Dec. 24, 1923	Dec. 31, 1923†	
Smokeless lump.....	Columbus....	\$6.30	\$3.35	\$3.35	\$3.25@ \$3.50	Franklin, Ill. lump.....	Chicago.....	\$5.35	\$3.60	\$3.50	\$2.00@ \$3.75
Smokeless mine run.....	Columbus....	6.00	2.10	1.85	1.75@ 2.00	Franklin, Ill. mine run.....	Chicago.....	4.10	2.35	2.35	2.25@ 2.50
Smokeless screenings.....	Columbus....	5.50	1.25	1.25	1.20@ 1.35	Franklin, Ill. screenings...	Chicago.....	3.10	1.80	1.95	1.75@ 2.00
Smokeless lump.....	Chicago.....	7.75	3.35	3.50	3.25@ 3.75	Central, Ill. lump.....	Chicago.....	4.35	3.00	3.00	2.75@ 3.25
Smokeless mine run.....	Chicago.....	6.60	1.80	2.10	2.00@ 2.25	Central, Ill. mine run.....	Chicago.....	3.10	2.10	2.10	2.00@ 2.25
Smokeless lump.....	Cincinnati...	6.75	3.10	3.10	2.75@ 3.50	Central, Ill. screenings...	Chicago.....	2.20	1.50	1.55	1.85@ 1.60
Smokeless mine run.....	Cincinnati...	6.25	2.00	2.00	2.00@ 2.25	Ind. 4th Vein lump.....	Chicago.....	5.10	3.25	3.25	3.00@ 3.85
Smokeless screenings...	Cincinnati...	6.10	1.50	1.75	1.50@ 2.00	Ind. 4th Vein mine run...	Chicago.....	3.85	2.60	2.60	2.50@ 2.75
*Smokeless mine run.....	Boston.....	8.60	4.40	4.45	4.60@ 4.75	Ind. 4th Vein screenings...	Chicago.....	2.35	1.70	1.70	1.60@ 1.80
Clearfield mine run.....	Boston.....	4.25	1.90	1.80	1.50@ 2.25	Ind. 5th Vein lump.....	Chicago.....	4.75	2.50	2.50	2.25@ 2.75
Cambridge mine run.....	Boston.....	4.80	2.35	2.35	2.25@ 2.75	Ind. 5th Vein mine run...	Chicago.....	3.60	2.10	2.10	2.00@ 2.25
Somerset mine run.....	Boston.....	4.40	2.15	2.10	1.75@ 2.50	Ind. 5th Vein screenings...	Chicago.....	2.35	1.50	1.55	1.50@ 1.60
Pool 1 (Navy Standard)...	New York....	6.25	3.00	3.00	2.75@ 3.25	Mt. Olive lump.....	St. Louis....	3.10	3.10	3.10	3.00@ 3.25
Pool 1 (Navy Standard)...	Philadelphia..	5.50	2.95	2.95	2.75@ 3.25	Mt. Olive mine run.....	St. Louis....	2.50	2.50	2.50	2.50
Pool 1 (Navy Standard)...	Baltimore....	6.00				Mt. Olive screenings...	St. Louis....	1.75	1.75	1.75	1.75@ 2.00
Pool 9 (Super. Low Vol.)...	New York....	5.35	2.25	2.25	2.00@ 2.25	Standard lump.....	St. Louis....	4.25	2.85	2.85	2.75@ 3.00
Pool 9 (Super. Low Vol.)...	Philadelphia..	5.30	2.35	2.35	2.10@ 2.60	Standard mine run.....	St. Louis....	2.10	1.95	1.95	1.90@ 2.00
Pool 9 (Super. Low Vol.)...	Baltimore....	5.10	2.25	2.00	2.00	Standard screenings...	St. Louis....	1.50	1.35	1.35	1.50@ 1.65
Pool 10 (H.Gr. Low Vol.)...	New York....	5.10	2.00	1.95	1.75@ 2.00	West Ky. lump.....	Louisville..	4.35	3.00	3.00	2.75@ 3.00
Pool 10 (H.Gr. Low Vol.)...	Philadelphia..	4.85	1.85	1.85	1.70@ 2.00	West Ky. mine run.....	Louisville..	3.35	1.75	1.60	1.35@ 1.90
Pool 10 (H.Gr. Low Vol.)...	Baltimore....	4.60	2.20	1.90	1.90	West Ky. screenings...	Louisville..	2.50	1.15	1.30	1.25@ 1.50
Pool 11 (Low Vol.).....	New York....	4.15	1.60	1.60	1.40@ 1.80	West Ky. lump.....	Chicago.....	4.25	2.85	2.85	2.75@ 3.00
Pool 11 (Low Vol.).....	Philadelphia..	4.45	1.65	1.65	1.55@ 1.75	West Ky. mine run.....	Chicago.....	2.75	1.75	1.75	1.50@ 2.00
Pool 11 (Low Vol.).....	Baltimore....	4.10	1.90	1.75	1.75						
High-Volatile, Eastern					South and Southwest						
Pool 54-64 (Gas and St.)...	New York....	3.55	1.60	1.60	1.50@ 1.75	Big Seam lump.....	Birmingham..	3.95	3.85	3.85	3.75@ 4.00
Pool 54-64 (Gas and St.)...	Philadelphia..	1.65	1.70	1.60@ 1.80		Big Seam mine run.....	Birmingham..	2.60	1.95	1.95	1.75@ 2.15
Pool 54-64 (Gas and St.)...	Baltimore....	3.85	1.85	1.50	1.50	Big Seam (washed).....	Birmingham..	2.60	2.35	2.35	2.25@ 2.50
Pittsburgh sc'd gas.....	Pittsburgh...	5.25	2.55	2.40	2.40@ 2.60	S. E. Ky. lump.....	Chicago.....	6.25	3.10	3.10	3.00@ 3.25
Pittsburgh gas mine run...	Pittsburgh...		2.25	2.25	2.20@ 2.30	S. E. Ky. mine run.....	Chicago.....	3.85	1.85	1.85	1.75@ 2.00
Pittsburgh mine run (St.)...	Pittsburgh...	3.10	2.05	2.00	1.90@ 2.10	S. E. Ky. lump.....	Louisville...	6.75	3.10	3.00	2.75@ 3.25
Pittsburgh slack (Gas)...	Pittsburgh...	3.00	1.50	1.65	1.60@ 1.75	S. E. Ky. mine run.....	Louisville...	3.50	1.75	1.60	1.50@ 2.00
Kanawha lump.....	Columbus....	5.25	2.85	2.60	2.50@ 2.75	S. E. Ky. screenings...	Louisville...	3.10	1.15	1.20	1.25@ 1.50
Kanawha mine run.....	Columbus....	3.10	1.60	1.60	1.50@ 1.75	S. E. Ky. lump.....	Cincinnati...	6.50	2.85	2.85	2.50@ 3.25
Kanawha screenings.....	Columbus....	2.85	0.95	1.05	1.00@ 1.25	S. E. Ky. mine run.....	Cincinnati...	3.35	1.55	1.55	1.85@ 1.75
W. Va. lump.....	Cincinnati...	6.25	2.85	2.55	2.25@ 3.00	S. E. Ky. screenings...	Cincinnati...	3.25	1.00	1.10	1.10@ 1.40
W. Va. Gas mine run.....	Cincinnati...	3.75	1.60	1.45	1.40@ 1.75	Kansas lump.....	Kansas City...	5.50	4.75	4.75	4.50@ 5.00
W. Va. Steam mine run...	Cincinnati...	3.35	1.60	1.45	1.40@ 1.75	Kansas mine run.....	Kansas City...	3.75	3.25	3.25	2.75@ 3.25
W. Va. screenings.....	Cincinnati...	3.10	0.80	1.20	1.10@ 1.50	Kansas screenings...	Kansas City...	2.50	2.00	2.00	2.00
Hooking lump.....	Columbus....	5.25	2.90	2.60	2.50@ 2.75						
Hooking mine run.....	Columbus....	2.85	1.85	1.75	1.65@ 2.00						
Hooking screenings.....	Columbus....	2.60	1.15	1.30	1.25@ 1.40						
Pitta. No. 8 lump.....	Cleveland...	4.75	2.45	2.45	2.00@ 2.90						
Pitta. No. 8 mine run.....	Cleveland...	3.25	1.95	1.90	1.85@ 1.90						
Pitta. No. 8 screenings...	Cleveland...	3.10	1.60	1.50	1.50@ 1.60						

† Gross tons, f.o.b. vessel, Hampton Roads.
* Advances over previous week shown in heavy type, declines in italics.

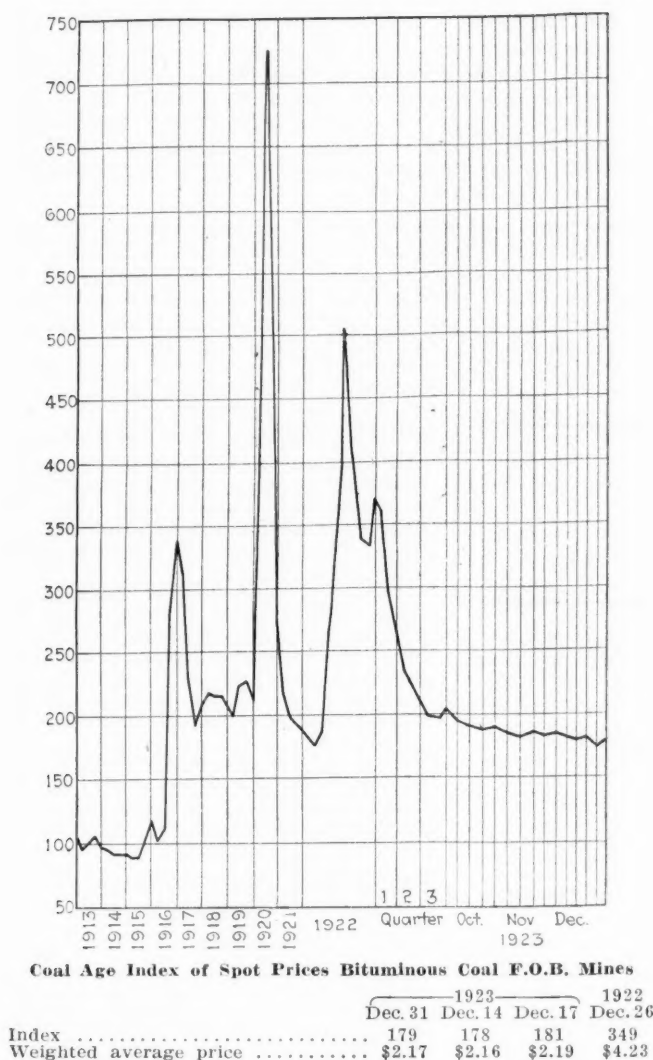
* Gross tons, f.o.b. vessel, Hampton Roads.

† Advances over previous week shown in heavy type, declines in *italics*.

Current Quotations—Spot Prices, Anthracite—Gross Tons, F.O.B. Mines

		Freight Rates	Dec. 26, 1922		Dec. 24, 1923		Dec. 31, 1923†	
Market Quoted			Independent	Company	Independent	Company	Independent	Company
Broken.....	New York.....	\$2.34	\$9.00	\$7.75@ \$8.25	\$8.50@ \$10.00	\$8.00@ \$9.25	\$8.00	\$8.00@ \$9.25
Broken.....	Philadelphia.....	2.39		7.90@ 8.10				
Egg.....	New York.....	2.34	9.25@ 12.00	8.00@ 8.35	9.85@ 10.50	8.75@ 9.25	9.50@ 10.00	8.75@ 9.25
Egg.....	Philadelphia.....	2.39	9.25@ 11.00	8.10@ 8.35	9.85@ 12.20	8.75@ 9.25	9.85@ 11.00	8.75@ 9.25
Egg.....	Chicago*.....	5.06	12.50@ 13.00	7.20@ 8.25	9.60@ 12.50	8.00@ 8.35	9.60@ 12.50	8.00@ 8.35
Stove.....	New York.....	2.34	9.25@ 12.00	8.00@ 8.35	9.85@ 11.00	8.75@ 9.25	9.85@ 11.00	8.75@ 9.25
Stove.....	Philadelphia.....	2.39	9.25@ 11.00	8.15@ 8.35	9.85@ 12.20	8.90@ 9.25	9.85@ 11.00	8.90@ 9.25
Stove.....	Chicago*.....	5.06	12.50@ 13.00	7.35@ 8.25	9.60@ 12.50	8.00@ 8.35	9.60@ 12.50	8.00@ 8.35
Chestnut.....	New York.....	2.34	9.25@ 12.00	8.00@ 8.35	9.85@ 11.00	8.75@ 9.25	9.85@ 11.00	8.75@ 9.25
Chestnut.....	Philadelphia.....	2.39	9.25@ 11.00	8.15@ 8.35	9.85@ 12.20	8.90@ 9.25	9.85@ 11.50	8.90@ 9.25
Chestnut.....	Chicago*.....	5.06	12.50@ 13.00	7.35@ 8.35	9.60@ 12.50	8.00@ 8.35	9.60@ 12.50	8.00@ 8.35
Range.....	New York.....	2.34		8.25		9.00		9.00
Pea.....	New York.....	2.22	7.00@ 11.00	6.15@ 6.30	6.00@ 6.50	6.15@ 6.65	5.75@ 6.85	6.15@ 6.65
Pea.....	Philadelphia.....	2.14	7.00@ 8.00	6.15@ 6.20	6.35@ 7.50	6.35@ 6.60	6.00@ 7.25	6.35@ 6.60
Pea.....	Chicago*.....	4.79	7.00@ 8.00	5.49@ 6.03	6.00@ 6.75	5.40@ 6.05	6.00@ 6.75	5.40@ 6.05
Buckwheat No. 1.....	New York.....	2.22	4.00@ 5.00	4.00@ 4.10	2.00@ 3.00	3.50	2.00@ 3.00	3.50
Buckwheat No. 1.....	Philadelphia.....	2.14	5.00	4.00	2.25@ 3.50	3.50	2.00@ 3.60	3.50
Rice.....	New York.....	2.22	3.00@ 3.25	2.75@ 3.00	1.35@ 2.25	2.50	1.35@ 2.25	2.50
Rice.....	Philadelphia.....	2.14	2.50@ 2.75	2.75@ 3.00	1.75@ 2.50	2.50	1.50@ 2.50	2.50
Barley.....	New York.....	2.22	1.75@ 2.00	1.50@ 2.00	1.00@ 1.50	1.50	1.10@ 1.50	1.50
Barley.....	Philadelphia.....	2.14	1.00@ 1.75	2.00	1.00@ 1.50	1.50	1.00@ 1.50	1.50
Birdseye.....	New York.....	2.22		2.10	1.25@ 1.45	1.60		1.60

* Net tons, f.o.b. mines. † Advances over previous week shown in heavy type, declines in *italics*.



This diagram shows the relative, not the actual, prices on fourteen coals, representative of nearly 90 per cent of the bituminous output of the United States weighted first with respect to the proportions each of slack, prepared and run-of-mine normally, shipped, and second, with respect to the tonnage of each normally produced. The average thus obtained was compared with the average for the twelve months ended June, 1914, as 100, after the manner adopted in the report on "Prices of Coal and Coke, 1913, 1918," published by the Geological Survey and the War Industries Board.

coal even including screenings is very dull. Screenings, however, bring 75c. to \$1 over prices of a few weeks back. Some of the Western Kentucky screenings are quoted at \$1.50 a ton, but highest sales found are \$1.25@ \$1.40. Mine run and prepared sizes show no change. Eastern Kentucky shows no material change from a week ago. Trade is light all around.

Northwest Is Quiet Too

A Duluth observer reports that the business is in a state of coma there and that nothing is maintaining the price circulars except an uncertainty as to the attitude the miners' union will take toward a strike April 1. In that city even domestic call is light in spite of a touch of winter.

There is no business in Milwaukee because of the failure of winter to deliver ice and snow but prices are steady. At the Twin Cities activity is lacking except among coal salesmen. Lignite from Dakota has had its effect and is getting some of the trade, even though the fuel value of this material is low.

It is estimated that 900,000 tons of soft coal and 240,000 tons of hard coal are on the docks at the Head-of-the-Lakes.

Little Doing in the West

Western markets are as light as those elsewhere. The surplus of coal that has been accumulating in the Kansas and Oklahoma fields is still on hand and prices have begun to soften in order to move it. During Christmas week the

average working time for the Southwest was two days but even that production could not all be sold.

In Utah and Colorado markets are light for everything and domestic sizes are generally soft. Dealers are not stocking now.

Ohio Markets Quiet

The market in Ohio was quiet during the holiday season. At Columbus buying was at a low point, consisting chiefly of small lots. Only a few large orders were reported as placed and the volume of business looked somewhat smaller than usual for this time of the year. Reduction in domestic consumption caused the closing of more Ohio mines and those operating are on a two to three days' weekly schedule. Retail prices have slumped in keeping with mine prices. In the Cincinnati market slack leads the market in demand, some of the activity coming through industrial and utility plants "covering" because of shut downs of their normal sources of supply. The market for both high and low volatile offerings is firm. Domestic coals are still in a bad way and retail dealers are curtailing their orders. There has been no change in the retail situation either as to price or demand. River business slackened on account of the holiday season. Demand at Cleveland was dull.

The Pittsburgh market continues in poor condition. Sales are hard to put through, there being little open market demand. There is some strike talk, but as yet there is very little disposition on the part of consumers to add to their stocks. Demand for domestic coals has been particularly poor on account of weather conditions. There is practically no demand at Buffalo. Slack is in better demand.

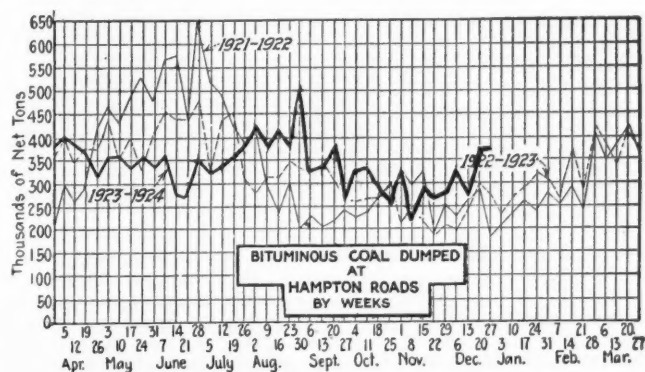
Buying Quiet in New England

In New England the year opens with an extremely quiet market. In no direction is there buying of any moment and receipts, both all-rail and by water, are very light. Scattering purchases that were made some weeks ago when prices were at a minimum have about ceased. The textile and other industries face a more encouraging prospect, but reserves are so large that no favorable reaction on coal is looked for until there is talk of possible labor troubles in April. Railroads and power companies are still receiving tonnage on old contracts, but the volume is notably less than during the first half of 1923. Generally there is an air of such complete dullness that the trade is all but discouraged.

At Hampton Roads the amount of coal at the piers is said to be less than at any time since June, but of course this situation is partly due to no work over the holidays. Quotations are firmer, but not so much because of any improvement in demand. No. 1 Navy acceptable grades can still be bought at \$4.60 per gross ton f.o.b. vessel, but several of the agencies are adhering to a \$4.75 level, preferring to keep the coal in the ground rather than net further losses. In consequence, on-car prices at this end are reasonably well maintained at \$5.75 to \$6 per gross ton for the same coals.

No Activity Along the Seaboard

The soft coal trade along the seaboard is quiet. There are numerous inquiries, and the prospects for better business early in January are bright. Buyers remained out of the market on account of inventory taking. At Philadelphia the trade at times seems to be a bit duller than usual. Consumers showed no interest and the early part of the new



year did not show anything better. Consumption was cut down, due to many mills closing on account of the holiday period, while the iron industry is not working anywhere near the capacity of two months ago. The Birmingham market is quiet. Inquiry is light for both steam and domestic coals. Production was slightly off, due to the holiday season, but there is plenty of coal above ground to meet all requirements.

Demand for Anthracite Easier

There is further easiness in the anthracite market at New York and Philadelphia. Demand fell off and quotations for independent domestic coals were easier. Pea coal is so plentiful that it is reported at New York that some of the large operating companies are cutting their prices in order

to keep the supply moving. At Philadelphia demand is poor for independent coals and the highest quoted prices are nominal. The softened market also hit the retail trade and one dealer has reduced his prices \$1 a ton. Stove and chestnut stocks are accumulating with almost every dealer having capacity stock of pea coal. The steam sizes are moving better, and barley is reasonably tight, some wholesale dealers being sold well ahead.

The coke market is steady. It is said that at least one first quarter contract and possibly two or three others, has been made at \$3.75, and other contracts have been made as high as \$4.40. Spot furnace coke remains at \$3.75@\$.4, and spot foundry coke at \$5@\$.50. A fair number of contracts for foundry coke have been made at \$6@\$.60.

Foreign Market And Export News

British Coal Market

The holiday season resulted in business being practically suspended in the South Wales coal market. Bunker supplies are limited and the demand for steam coals is somewhat easier.

British coal exports during the 11 months ended Nov. 30 were 73,575,713 tons as compared with 73,400,118 tons in the 12 months of 1913, the best previous record, according to official British Board of Trade statistics obtained by the Bankers Trust Co. of New York. Exports in 1922 were approximately 58,243,000 tons.

The Egyptian and Sudan governments are reported to be asking for bids for 200,000 tons of second admiralty and Monmouthshire coals by Feb. 5 and monthly deliveries beginning March. Other substantial inquiries are reported in the market.

Coal and Coke Exports and Imports

During November, 1923 the United States exported 369,429 tons of anthracite and 1,253,445 tons of bituminous coal, as compared with 440,608 tons of hard coal and 1,618,037 tons of soft coal in the corresponding month of 1922. Of the coal sent abroad last November Canada received 1,035,066 tons, Italy, 40,159 tons, France, 30,272 tons and Brazil 24,285 tons. Imports of coal during the same month was 8,690 tons of anthracite and 46,399 tons of bituminous as compared with 12,631 tons of hard coal and 366,423 tons of soft coal in November of 1922. Coke exports in November last amounted to 49,363 tons as compared with 38,397 tons in the previous November, with imports of 2,056 tons in November as compared with 8,543 tons in the corresponding month of the previous year.

Norwegian Coal Output

The annual report of the Great Norwegian Spitzbergen Coal Company for the year ended June 30, 1923, shows that production of coal for the year was 113,620 tons, and machinery installed since the close of the year is expected to bring the output up to 15,000 tons monthly. The quantity shipped during the period was 149,079 tons and the stock in hand at June 30 last 30,739 tons. The company's

largest customers are the Norwegian State Railroads and some large steamship owners.

Export Clearances, Week Ended Dec. 29, 1923

FROM HAMPTON ROADS

For Cuba:	Tons
Nor. SS. Gunnar Heiberg, for Havana.....	3,222
Dan. SS. Phonix, for Santiago.....	2,021
For Corsica:	
Amer. SS. Jalapa, for Porto Vecchio de Piombino	6,026
For Argentina:	
Ital. SS. Olimpo, for Buenos Aires.....	4,313
For Brazil:	
Br. SS. Bedecray, for Rio de Janeiro.....	5,103
Ital. SS. Proteo, for Porto Ferrajo.....	6,436
For Italy:	
Ital. SS. Valnagra, for Porto Ferrajo.....	6,436

FROM BALTIMORE

For France:	
Fr. SS. Capitaine Boudouin, for Nice.....	6,441
For Italy:	
Czechoslovakian SS. Legie, for Genoa.....	7,822
For Chile:	
Br. SS. Gibraltar (coke).....	4,200

French Coal Output Increases

In order to keep down the high cost of living the French authorities have asked the coal producing companies to reduce the increases recently made on the price of the various coals, the advance on sized coals to be 5 fr. instead of 10 fr. and on flaming coals 3 fr. instead of 5 fr.

During October the French mines produced 3,689,858 metric tons of coal as compared with 3,321,297 tons in September, and 190,225 tons of coke as compared with 181,648 tons in the previous month. The imports consisted of 1,935,821 tons of coal and lignite and 282,806 tons of coke. Imports in September were 2,619,831 tons of coal and lignite and 280,316 tons of coke. In October there was exported 121,915 tons of coal and lignite as compared with 156,137 tons in September; and 44,082 tons of coke, a decrease of 6,862 tons when compared with the previous month.

There was delivered to France and Luxemburg from the Ruhr during November 213,200 tons of coal, 298,800 tons of coke and 28,900 tons of briquets, a total of 540,900 tons, as compared with a total of 354,500 tons delivered in October.

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Business at Hampton Roads was unchanged last week, with the usual holiday dullness. Variations in price, if any, were slight, and little effort was made in the trade to push business until after Jan. 1.

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The tone of the market was weak, but shippers looked forward to immediate improvement in trade after the first of the year.

United States November Domestic Coal Exports

(In Gross Tons)

	1922	1923
Anthracite.....	440,608	369,429
Value.....	\$4,845,304	\$4,183,717
Bituminous.....	1,618,037	1,253,445
Value.....	\$10,467,872	\$6,214,493
Coke.....	38,397	49,363
Value.....	\$492,495	\$490,443

Eleven Months Ended
November

Anthracite.....	1,983,829	4,215,821
Value.....	\$21,130,186	\$45,919,835
Bituminous.....	9,614,195	18,076,953
Value.....	\$56,453,975	\$99,040,142
Coke.....	333,291	1,059,819
Value.....	\$3,469,559	\$11,469,421

Pier and Bunker Prices, Gross Tons

PIERS

	Dec. 22	Dec. 29
Pool 9, New York.....	\$5.00@ \$5.25	\$5.00@ \$5.25
Pool 10, New York.....	4.75@ 5.00	4.75@ 5.00
Pool 11, New York.....	4.50@ 4.75	4.50@ 4.75
Pool 9, Philadelphia.....	4.90@ 5.20	4.90@ 5.20
Pool 10, Philadelphia.....	4.50@ 4.90	4.50@ 4.90
Pool 11, Philadelphia.....	4.25@ 4.60	4.25@ 4.60
Pool 1, Hamp. Roads.....	4.50@ 4.60	4.50@ 4.65
Pools 5-6-7 Hamp. Rds.....	4.10@ 4.25	4.15@ 4.25
Pool 2, Hamp. Roads.....	4.25@ 4.35	4.25@ 4.30

BUNKERS

Pool 9, New York.....	5.30@ 5.55	5.30@ 5.55
Pool 10, New York.....	5.05@ 5.30	5.05@ 5.30
Pool 11, New York.....	4.80@ 5.05	4.80@ 5.05
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Pool 2, Hamp. Roads.....	4.25@ 4.35	4.25@ 4.35

Hampton Roads Pier Situation

N. & W. piers, Lambert's Pt.:	Dec. 20	Dec. 27
Cars on hand.....	2,142	1,724
Tons on hand.....	124,217	110,586
Tons dumped for week.....	132,439	153,338
Tonnage waiting.....	10,000	9,325
Virginian Ry. piers, Sewalls Pt.:		
Cars on hand.....	1,092	1,205
Tons on hand.....	66,450	78,800
Tons dumped for week.....	79,742	79,401
Tonnage waiting.....	4,500	8,115
C. & O. piers, Newport News:		
Cars on hand.....	1,417	1,785
Tons on hand.....	71,740	94,735
Tons dumped for week.....	105,611	86,109
Tonnage waiting.....	6,315	6,610

Traffic News

Private-Car Owners Present Strong Case In Assigned-Car Rehearing; Union Hints

Oral arguments in the assigned-car case were presented the Interstate Commerce Commission, Dec. 17, 18 and 19, and the rehearing granted by the commission after its original order of last spring, abolishing the practice stands submitted to the commission for decision. The commission has extended suspension of its original order until April 1, from Feb. 1, which was the last date fixed by the several previous extensions.

Private-car owners are considered to have presented a strong case to the commission. The steel interests were represented by an array of attorneys, the trend of whose arguments was that the steel industry cannot be operated economically without the use of private coal cars. A. G. Gutheim, representing a group of private-car owners who are consumers or shippers or both consumers and shippers, stated that private-car owners do not expect preferential movement of their cars by the carriers.

In behalf of the American Railway Association, Judge R. V. Fletcher stated that the railroads would agree that assigned cars be restricted to mines owned by railroads and to mines under contract with railroads for their entire year's output.

The construction of Paragraph 12 of Section 1 of the Interstate Commerce Act, which provides that all cars set at a mine shall be counted in the mine's rating, was brought into the case as to whether it should be considered literally or whether it really made into statute the principle of the Thayer case some years ago, in which the commission held in effect that it could rate mines from day to day. Commissioner C. B. Aitchison asked Judge Fletcher whether he considered this section a legal or an administrative matter. The attorney replied that he differed from some of his colleagues and considered it administrative. If the section be administrative, then there can be no appeal to the courts from any ruling of the commission under the section.

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Under the reorganization plan the Reading Company itself was authorized to take over and operate the Philadelphia & Reading R.R. system and its component railroad subsidiaries and to issue \$63,084,666 in new 4½ per cent gold bonds in exchange for old securities. The merger is the result of an

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year did not show anything better. Consumption was cut down, due to many mills closing on account of the holiday period, while the iron industry is not working anywhere near the capacity of two months ago. The Birmingham market is quiet. Inquiry is light for both steam and domestic coals. Production was slightly off, due to the holiday season, but there is plenty of coal above ground to meet all requirements.

Demand for Anthracite Easier

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Pools 5-6-7 Hamp. Rds.	4.10@ 4.25	4.15@ 4.25
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News Items From Field and Trade

KENTUCKY

The L. & N. railroad is reported to have bought properties at Ermine, three miles from Whiteburg, for the extension of yards there. This is expected to aid in the ready movement of coal from the Harlan and Hazard fields.

Of twenty-three cases decided by the Kentucky Workmen's Compensation Board on Dec. 18, all but four were in connection with accidents of employees of coal companies. In two coal company cases compensation was denied, but it was allowed in all of the others.

The 1923 tax assessment for Harlan County is \$24,302,131, as compared with an assessment of \$20,870,150 in 1922, which was increased by the supervisors to \$23,831,165. Coal has made the southeastern Kentucky district.

Willard R. Jillson has been asked by Governor Fields to continue as state geologist. Mr. Jillson was appointed under the Republican administration, but has handled his office so well that the new régime wishes to keep him on the job.

The Logan Pocahontas Fuel Co., Cincinnati, recently opened a branch sales office in the Inter Southern Building, Louisville, in charge of C. D. Calloway.

Fred M. Sackett, of the Byrne & Speed Coal Co., Louisville, headed a recent successful campaign to finance a Memorial Auditorium Fund of about \$1,500,000. He also is working hard on a campaign for erection of a \$7,000,000 bridge across the Ohio River to connect Louisville with Jeffersonville and New Albany. There are now three railroad bridges, all for steam lines, one having roadways, and two being utilized by electric lines as well.

ILLINOIS

Following the expenditure of \$15,000 for improvements, the Rutland coal mine, which was recently purchased by a group of business men from Ottawa, is expected to reopen soon for operation. Those interested are Lee O'Neil Browne, A. E. Butters, Fred T. Scherer, J. L. Bane, George L. Farnsworth and Louis Gowan.

T. H. Green, formerly superintendent of the mine at Girard, Ill., and more recently holding a similar position with the Standard Oil Co. mine at Shoper, until it recently closed down, has been named superintendent of the "Old Mine" at Auburn, which was recently purchased by the Leland Coal Co. of Chicago.

Drilling on a tract of land—the Hennessy farm—two miles east of Murphysboro is expected to develop a good acreage of No. 1 and No. 2 seam of coal unworked. It has been generally understood that all of this coal was under lease, but this farm was not included. It is on the electric line.

The new Shuler mine, at Alpha, has come into the realm of producing mines, as 100 tons of coal was hoisted Dec. 12, the first day the mine was operated. Charles Shuler, Jr., of Alpha is manager of the mine. Within the first month of operation the hoist will be raised to 300 tons of coal daily, with probable production of 1,000 tons a day when the mine is in full working condition.

The United Electric Coal Co. has acquired during the past year 2,500 acres of coal land within three miles of Cuba, at a cost of over \$300,000. A steel tippie and top works are under construction with a capacity of 4,000 tons per eight hours. Three steam shovels are at work. The total investment in this, one of the largest strip operations in the country, is about \$1,000,000. The Tiger Coal Co. also is opening up a strip mine near Cuba, with a capital invested of \$100,000.

The miners at the Valley Coal Co. mine, north of Duquoin, who sued for wages, have withdrawn their suits. The mine was being prepared for reopening under the direction of J. L. Mitchell of Royalton, who recently died. His death halted the work. The in-

vestors are hopeful of continuing the work, however.

The supply building containing the machine and blacksmith shops of Peabody No. 9 mine near Taylorville was destroyed by fire Christmas week, with a loss of about \$15,000. Defective wiring was the probable cause.

The Cripple Creek Coal Co., which has acquired leases to a large tract of land east of Galesburg, is arranging to have a core bore made on the land.

MINNESOTA

C. A. Bruce, secretary of the Twin City Coal Exchange, announced on Dec. 11 that the exchange will file a formal protest against the proposed increase in through rail rates on anthracite from the principal Pennsylvania mines to Minneapolis and other Northwestern points. The freight rate on anthracite, if changed, will mean an increased transportation cost of \$1.66 on a net ton of hard coal, Mr. Bruce said. Several other Northwestern organizations are planning to protest the proposed rail rate, according to Mr. Bruce.

Freight charges were more than twice the cost of coal recently bought by the City of Minneapolis for the crematory. A recent shipment of 712 tons of coal from Burton, Ill., cost at the mine a total of \$1,068.12, while the freight was \$2,342.64. Thus the coal cost \$1.50 a ton and the freight amounted to \$3.29 a ton.

NEW YORK

Announcement has been made of awards of coal contracts by the New York State Department of Purchases as follows: Shawnee Fuel Co., New York City, Binghamton State Hospital, 1,200 net tons slack, \$1.85 f.o.b. mine, and Central Islip State Hospital, 2,000 tons bituminous run of mine, \$1.63 per ton; Clark Coal & Coke Co., New York City, Elmira Reformatory, 1,200 tons bituminous run of mine, \$1.70 per net ton f.o.b. mine; Savage-Vail Corp., Indiana, Pa., Syracuse State School, 200 net tons run of mine, \$1.69, and Fidelity Fuel Co., New York City, Binghamton State Hospital, 5,000 net tons barley coal, \$1.20 per ton.

Jackson E. Reynolds, president of the First National Bank, has been elected to the board of managers of the Delaware, Lackawanna and Western R.R. to succeed Frank Rysavy, who has resigned. Mr. Reynolds is head of the Jackson E. Reynolds Syndicate, which recently bought the stock of the Lehigh & Wilkes-Barre Coal Co.

The Delaware, Lackawanna & Western Coal Co. on Dec. 26 declared an extra dividend of 5 per cent in addition to the regular quarterly distribution of 2½ per cent.

Stockholders of the Consolidation Coal Co. have approved changes in the certificate of incorporation permitting a change in the par value of the company's common stock and also the creation of an issue of \$10,000,000 7 per cent cumulative preferred stock, the proceeds of which will be used to reimburse the treasury of the company for capital expenditures and the acquisition of new properties.

The votes of the members of the American Institute of Mining and Metallurgical Engineers for officers and directors for the ensuing year are to be counted Feb. 13. Ballots to be counted must reach the secretary on or before Feb. 12. The official ballot of the Committee on Nominations is: William Kelly, director and president; E. DeGolyer, director and vice president; Charles W. Merrill, director and vice president; directors, R. V. Norris, George Otis Smith, P. B. Butler, Bertram D. Quarrie and L. D. Ricketts. Members will vote also to amend the constitution by making a life membership cost \$225 instead of \$150, and also that a junior associate member may remain such not longer than six years, the period to begin Jan. 1 of the year of election. The article now in force reads that a junior associate member may remain such not longer than five years after leaving an engineering school.

OHIO

An issue of \$2,000,000 collateral trust 6 per cent serial gold notes of The Houston Collieries Co., maturing 1924-1933, has been purchased by a Cincinnati financial syndicate. The notes will be offered in the public market at prices to yield 5.75 to 6.50 per cent according to the various maturities.

John Emslie, manager of the Creech Fuel Co., Fred Gore, sales manager of the Blue Diamond Coal Sales Co., and Ernie Howe, manager of the Pocahontas Fuel Co., were elected directors of the Cincinnati Coal Exchange at the annual election held at the Chamber of Commerce.

The Virginia & Kentucky Coal Co. has been incorporated by J. Bert Shumate and Fred Dunker, formerly of the Pocahontas-Kanawha Coal Co., of Dayton. Offices have been taken on the 11th floor of the First National Bank Building in Cincinnati.

W. M. Tobin, who has been fuel inspector for the Milwaukee Coke & Gas Co., for some time at Cincinnati, has been added to the sales force of the Imperial Coal Sales Co., of that city.

PENNSYLVANIA

The Lehigh & Wilkes-Barre Corporation, the holding company for Lehigh & Wilkes-Barre Coal Co., has sold \$10,000,000 5½ per cent collateral trust bonds, dated Jan. 2, 1924. The corporation owns 149,788 shares of the outstanding capital stock of the coal company, formerly the property of the Central Railroad of New Jersey and ordered sold by the courts. These shares are assigned to The First National Bank of New York City, as trustee, of which Jackson E. Reynolds, is president as collateral security for the payment of the principal and interest of the bonds. C. F. Huber is president of the corporation and also president of the coal company. The board of directors of the coal company paid on Dec. 24 an extra cash dividend of \$40 per share on its capital stock.

Judge Thomas F. Bailey at Huntingdon, on Dec. 26 appointed Andrew S. Webb, of Philadelphia, receiver for the Joseph E. Thropp Co., Inc., which operates iron and coal mines and coke ovens in Pennsylvania and Virginia. The assets were given as \$2,400,000, and the liabilities, \$1,300,000, with quick assets of only \$675,000. The slump in the iron business and inability to obtain additional working capital were given as reasons for the receivership. The appointment was made on a petition of creditors although officials of the corporation declared it was solvent and that all its indebtedness would be paid. The business will be continued by the receiver, whose bond was fixed at \$100,000.

A charter for the Philadelphia & Reading Coal & Iron Corporation was filed at the State Department at Dover, Del., Dec. 20. The new concern was created as a result of the segregation of the Reading Company properties, and will take over the interests of the Philadelphia & Reading Coal & Iron Co. and the Reading Iron Co. The new corporation is authorized to issue 1,400,000 shares of capital stock, without nominal or par value. The incorporators are William J. Richards, Pottsville, Pa., president of the old company; Robert J. Montgomery, Philadelphia, vice president and general coal agent, and William H. MacEwan, Haverford, Pa., vice president and secretary.

Fire, which is believed to have been started by an overheated journal, on Dec. 24, destroyed the washery of the Avoca Coal Co. in Avoca, which is valued at about \$70,000. Early this summer the owners spent \$20,000 in repairing and rebuilding the structure. The loss is partly covered by insurance, it is understood.

WISCONSIN

A special committee of the School Board of Milwaukee, is engaged in studying the merits of Western and Eastern soft coal with a view to a possible trial of the former. Heretofore all city contracts have been let to dock companies handling Eastern coal.

WASHINGTON

The Chicago Pneumatic Tool Co., New York, announces the appointment of the General Machinery Co. of Spokane, Washington as their agents in the eastern part of the State of Washington and northern part of Idaho.

WEST VIRGINIA

The W. M. Ritter Lumber Co., of Columbus, Ohio, has acquired by purchase in fee simple a tract of approximately 67,000 acres of coal and timber lands in Wyoming County, W. Va., which is located near the Virginian R.R. The purchase carried a consideration of \$1,600,000. The entire tract is underlaid with coal varying from 36 in. to 72 in. thick and 28,000 acres of which has smokeless grades. The other is about equally divided between the New River and Kanawha veins. The purchase was made from the Dalton-Kelley-Crane interests.

Formal organization of the Sullivan Pocahontas Coal Co. was effected at a meeting held at Tralee when the following officers were elected: J. C. Sullivan, president and treasurer; Dr. J. A. Wood, of Pratt, vice-president; J. B. Frank, of Tralee, secretary. On the board of directors are the above-named officers and the following: Dr. J. H. Craft, of Springton; James Gorman, of Lynchburg, Va.; R. J. Hancock, of Lynchburg, and H. W. McNeil, of Tralee.

Major Appleyard, of England, who owns extensive mining interests in the Durham district of Great Britain, in company with several associates inspected the mines in the Pocahontas district recently.

A dissolution certificate has been filed with the Secretary of State of West Virginia by the Balkan Coal Co., the main offices of which are in Philadelphia. The Loop Coal Co., of Elkins, also has filed notice of dissolution with the Secretary of State of West Virginia.

Thomas H. Laulis, of Shinnston; Charles E. Pitter, of Fairmont, and associates have chartered the Laurel Run Coal Co., with \$250,000 capital for developing coal land on Laurel Run.

It was only after the Charter of Local 4,047, at Grant Town, had been revoked that the five hundred miners employed at Federal Mine No. 1 of the New England Fuel & Transportation Co. returned to work after having been engaged in an illegal strike from Dec. 11 to 15.

E. Macon Jones has resigned his position with the Twin States Fuel Co. of Hington to become assistant to the Western manager of the Chesapeake & Virginian Fuel Co., of Cincinnati.

The Howard Thacker Coal Co. has just been organized by McDowell County coal men, with a capital stock of \$25,000. Headquarters of the company are to be at Welch. Incorporators are: George W. Lambert, James P. Flannagan, Thomas J. Flanagan, E. W. Howard and J. N. Harman, Jr.

The Wheeling Steel Corporation has completed arrangements to purchase a large tract of coal land in Mason County, extending from a point near New Haven to Letart, along the Ohio River. This coal is said to be in the Pittsburgh and Freepot seams.

Announcement has been made that the Raleigh Fire Creek Coal, the Pickshin Coal Co., Tommy Creek Coal Co., Wood-Sullivan Coal Co., Barkers Creek Coal Co., Hartly Coal Co. and the Mead Pocahontas Coal Co. have been merged into the Sullivan Pocahontas Coal Co. The mines of the various individual companies are located on the Virginian, Chesapeake & Ohio and the Norfolk & Western Rwy's. The headquarters of the new company will be at Tralee.

The Coal River Co-operative Coal Co. has been organized by Buckhannon people to engage in the development of coal lands in Upshur and other counties of the state. The new concern is capitalized at \$50,000. Identified with the new concern are I. G. Cutright, G. C. Christner, C. A. Winchester, G. E. Stearns and D. A. Barton.

In connection with the visit of three members of the international board of the United Mine Workers to Charleston recently C. F. Keeney denies that the committee was sent to investigate the affairs of the district. The district president said that the committee came to confer with D. C. Kennedy, secretary of the Kanawha Coal Operators Association, and to investigate complaints of inequality. It was explained by Keeney that the inequalities referred to differences in cost of production in different mines and that the operators asked that the inequalities be investigated with a view to appealing for a revision in their wage contracts with the miners.

The Lundale Mining Institute held its annual banquet at the Lundale Club late in December, marking the fifth successful year of the Institute. About three hundred members as well as prominent mining officials and railroad men attended. Among the speakers were George M. Jones president of the Logan County Coal Corporation; Walter R. Thurmond, president of the

Thurmond and Argyle Coal companies, and J. T. Ryan, vice-president and general manager of the Mines Safety Appliance Co., of Pittsburgh, Pa.

The Holly Elk Coal Co., has been organized at Clarksburg with \$250,000 capital and A. C. McIntyre president and general manager, for development of 1,500 acres of coal land in the Eagle and Sewell seams on Elk River in Webster County.

WASHINGTON, D. C.

John B. Pratt has resigned the editorship of *Coal Review* to take effect Jan. 1, after two years in that post. It is understood that he will re-enter the journalistic field with which he was actively connected prior to his becoming associated with the coal industry, four years ago. In 1919, when the Bituminous Operators' Committee of the Central Competitive Field was formed to present the operators' case before the Bituminous Coal Commission, he was secretary of that committee and in charge of its publicity work. Early in 1920 he became director of publicity for the National Coal Association. In July, 1921, he was also made editor of *Coal Review*.

The Board of Directors of the National Coal Association will hold their quarterly meeting in Washington, D. C., on Wednesday, Jan. 9, 1924, to consider the work of the association for the past six months. A number of important committee meetings will be held Jan. 8, among them the Government Relations Committee, the Bituminous Operators' Special Committee and the secretaries' of local associations. All of these committees will consider propositions of importance to the industry with a view to making recommendations to the directors' meeting.

CANADA

Output of coal from Canadian mines during September, according to the Dominion Bureau of Statistics, amounted to 1,218,000 net tons, a decrease of 24 per cent from the tonnage for the previous month and 21 per cent from the average for the month for the three preceding years. The output showed decreases of 162,000 tons in Nova Scotia, 171,000 tons in Alberta, 40,000 tons in British Columbia and 1,000 tons in New Brunswick. In Saskatchewan there was an increase of 1,000 tons. The cumulative output from all mines for the first nine months of 1923 amounted to 12,609,000 tons, an increase of 16 per cent over the preceding three-year average for the same period. Comparison of September and August figures covering the total importation of coal from the United States and Great Britain showed a decrease of 23 per cent. September imports amounted to 2,125,000 tons, while in August 2,746,000 tons was brought in. The September importations this year were 38 per cent greater than the three-year average for the month. During the month 78,100 tons was imported from Great Britain. Total importation of all coal for the nine months of 1923 was 17,518,900 tons, an increase of 52 per cent over the preceding three-year average for the same period. Imports of anthracite for September totalled 328,800 tons. This was 33 per cent less than in August, but 29 per cent higher than the three-year average for the month. Anthracite imported from the United States amounted to 287,900 tons, while 41,000 tons came from Great Britain during the month. Classified by grades, 301,100 tons was of egg, grate, stove, etc., sizes, and the balance 27,700 tons of buckwheat and rice sizes. The total amount of anthracite imported during the nine months of 1923 was 4,004,700 tons, an increase of 42 per cent over the three-year average for this period. The exports of Canadian coal for the month of September were 13 per cent less than in August. The quantities were: September 90,600 tons, August 103,500 tons. Comparison of the September exports with the preceding three-year average showed a decrease of 52 per cent.

J. E. McLurg has been appointed vice-president of the British Empire Steel Corporation in charge of operations of all constituent companies with headquarters at Sydney, N. S., to fill the vacancy caused by the resignation of D. H. McDougall. Mr. McLurg has been for some years general manager of Halifax Shipyards, Ltd.

The briquetting plant at Bienfait, Sask., being at present closed down for want of funds, two carloads of carbonized lignite were shipped for further treatment to the Babcock plant at Hebron, N. D. The completed briquettes have been re-shipped to Canada, and the members of the Lignite Utilization Board state that they are of first-class quality and that the success of the experiment has been demonstrated.

Association Activities

At a recent meeting of directors the Alabama Mining Institute re-elected Frank Nelson, Jr., as president for the ensuing year. Other officials named were George F. Peter, vice-president; Charles A. Moffett, chairman of the board, and James L. Davidson was re-elected secretary-treasurer, a position he has acceptably filled for several terms. The board of directors includes G. B. McCormack, J. W. McQueen, A. B. Aldridge, J. B. McClary, C. T. Fairbairn, S. L. Yerkes, George W. Connors, C. F. DeBardeleben and Charles A. Moffett.

At the annual meeting of the Philadelphia Coal Exchange, held Dec. 20, the following officers were elected to serve during 1924: President, Maurice J. Crean; Vice President, Samuel B. Crowell; Secretary-Treasurer, Charles K. Scull; Directors (to serve for three years), Arthur L. Cohn, Martin F. Connor, Samuel E. Donaghy, John E. Lloyd and Harry E. Strathmann. There are ten holdover directors, five for one year and five for two years.

The New River Coal Operators Association held its annual meeting at Mt. Hope Dec. 20 with a large attendance, companies shipping more than 95 per cent of the coal tonnage produced in the field being represented. Transportation and the effort to obtain an adjustment of rail rates to points north and east of the Potomac came in for discussion and there were addresses by H. L. Gandy, secretary of the National Coal Association; A. M. Belcher, attorney for the operators in the Logan armed march cases; Robert M. Lambie, chief of the West Virginia Department of Mines; A. M. Dudley, general freight agent of the Chesapeake & Ohio, and H. F. Brown, superintendent of the Hinton division of the same road. S. A. Scott, of the New River company, was chosen president; Ernest E. Chilson, general manager of the Raleigh Coal & Coke Co., vice president; P. M. Snyder, of Mt. Hope, treasurer; S. C. Higgins of Mt. Hope, secretary and traffic manager; members of the executive board, William McKell, president of the McKell Coal & Coke Co.; R. E. Taggart, of the Stonega Coal & Coke Co.; G. H. Caperton, New River Coal Co., and M. L. Garvey, of the Maryland and New River Coal Co.

Obituary

Julian Burrell Huff, coal operator and noted polo player, died on Dec. 24 at Philadelphia, Pa. Injuries received on the polo field are believed by physicians to have brought about his death, the immediate cause of which was a cerebral hemorrhage. Mr. Huff was president of the Keystone Coal & Coke Co., the Latrobe-Connelville Coal Co., the Mountain Coal Co., the Acme Gas & Coal Co. and several other gas and coal companies in western Pennsylvania.

I. N. Hanson, industrial builder and early developer in the coal fields of Alabama, died Dec. 16, at Bayou Le Batre, Miss., after a long illness. Mr. Hanson was a stockholder and director of the DeBardeleben Coal Corporation. He was a brother of the late Major J. F. Hanson, president of the Central of Georgia Ry. Mr. Hanson was 76 years of age and unmarried.

Lyman M. Graham, 78, retired president of the McLean County Coal Co., of Bloomington, Ill., died recently at his home after a long illness. Starting as a bookkeeper he served his company for 55 years of continuous service, retiring on Jan. 3, 1923. The firm was organized in 1867.

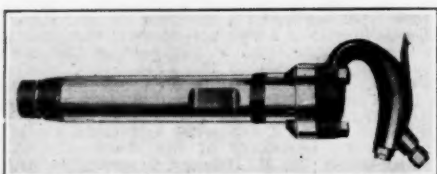
L. L. Legg, director of the Standard Coal Co. and Standard Fuel Co., Salt Lake City, and widely known in the coal-mining industry of Utah, died at Riverside, Cal., recently. He was born in Illinois in 1871.

Charles A. Tribbey, aged 49, died at his home, near Cincinnati, Ohio, Dec. 20. He started in many years ago with the White Oak Coal Co. and rose to be its manager. When that company went out of business, about nine years ago, he was associated with his brothers-in-law connected with the Ulland Coal Co. and in charge of its wholesale department. Six years ago, after the purchase of mines in northeastern Tennessee and southeastern Kentucky, he formed the Tribbey Coal Co. About four years ago he suffered a stroke of paralysis, which failed to yield to treatment and he retired two years ago. The funeral was held Dec. 22.

New Equipment

Riveting Air Hammer

A pneumatic riveting hammer of new type, with many improved and economical features, has been perfected and is now being offered by the Ingersoll-Rand Co., 11 Broadway, New York City. The outstanding features of this new riveter include bolted construction for holding the handle to the barrel, heavy section valve with liberal bearing surfaces; combination poppet and piston type throttle valve; power in excess of all ordinary requirements;



EASILY CONTROLLED AIR HAMMER.

This device is made in sizes ranging from 5-in. to 9-in. stroke.

low air consumption and exceptionally easy operation.

The new style hammers are manufactured in three styles, A, B, and C, and are available in a complete range of sizes from a 5-in. to a 9-in. stroke. Each size of this riveter can be purchased with any one of three types of barrels and with either outside or inside trigger handles.

The standard "A" type has a barrel machined to accommodate a rivet set clip only and is furnished on all orders which do not specify either a bridge type or retainer type barrel. Three alloy steel bolts of substantial size, fitted with lock washers, hold the handle to the barrel. This is an exclusive feature of these hammers and enables one to take them apart anywhere for inspection or cleaning with the aid of only a wrench; no vise, crowbar or other tools are necessary.

The throttle valve (except on inside trigger handles) is a combination of the piston and poppet types, having the nicety of control of the piston valve and the freedom from leakage of the poppet type. The beveled seat will remain tight throughout the life of the tool, preventing leakage. The throttle lever, or trigger, is made in one piece from special heat-treated spring steel and has a long bearing in the handle. The control is sensitive, ranging from a light tap to a heavy blow, entirely at the will of the operator.

The valve is a sturdy sleeve made from special alloy steel. It has liberal bearing surfaces and its walls are free from holes or ports, which so often are the starting points for checks or cracks. It operates in a valve box of strong construction, located in the head of the barrel. The valve box is constructed with a solid end which makes

it possible to take it apart easily by the use of a piston for the removal of the valve, without recourse to the use of a screwdriver or similar instrument with subsequent danger of injury. This construction also insures a compression chamber in the valve box which cushions the piston on the return stroke and prevents the piston from striking the handle.

The handles are of high quality steel, drop forged to a shape that fits the hand and are sand-blast finished to give an excellent grip. Either outside or inside trigger handles can be furnished, although the outside type is standard. The exhaust is through the side of the barrel near the handle and can be deflected in any direction desired by the operator, by merely turning the deflector.

They are fast, hard-hitting hammers, yet have less "kick-back" than usual and consume less air. Due, primarily, to the bolted-handle construction, they are lighter in the handle end and consequently are better balanced and easier holding, especially when used in a horizontal or inverted position.

Briquet Binder

A new binder for coal briquets has been developed by the Robeson Process Co., Fifth Avenue, New York City, which the company asserts may be easily handled, is strong, combustible, and burns without offensive characteristics. This substance is called glutrin, which is a trade name used to desig-

nate a material made from a product of the pulp mill in the manufacture of paper.

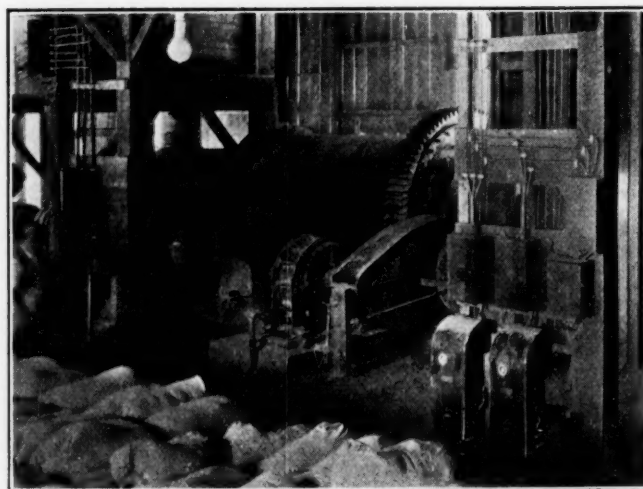
In appearance this material is a liquid of about the consistency of thin molasses. It is unaffected by heat or cold in handling and shipping, is strongly adhesive and will sustain the burden of the fire until the entire briquet is consumed. Being also both smokeless and odorless, its suitability for domestic use is apparent.

Air-Swept Dry Pulverizing Mill Suitable for Coal

The principle of the air-swept mill is to sift the superfluous material from the mass as and when it is finished to the desired fineness. It is a device which will be appreciated by everyone interested in the dry grinding of products, among which is pulverized coal for power purposes.

Unusual features of the plant are the tower drier, which consists of a system of baffling and requires no power to operate it, and the fact that it has no discharge lifters and no means of extracting the material except the velocity of the air through the mill. It is equipped with an air box at the feed end and one at the discharge end. These boxes have valves on both sides so that the quantity of air delivered at the feed end and taken out at the discharge end regulates absolutely the fineness of the product discharged.

The valves on the air box at the discharge end of the mill can be regulated so that the elevating power of the fan is maintained for lifting the material through the cyclones to the bin, as is evidenced by the sifting test. The complete mill equipment is manufactured by Kennedy-Van Saun Mfg. & Eng. Corp., 50 Church St., New York City.



PULVERIZING-MILL EQUIPMENT

Regulation of the air through the mill carries away the ground material when pulverized to the desired fineness.